Thirtieth Annual Report

of the

Ontario Agricultural and Experimental Union

1908

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

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1909

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TORONTO.

To the Honourable JOHN MORISON GIBSON, K.C., LL.D., etc., etc., etc.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Agricultural and Experimental Union for 1908.

Respectfully submitted,

JAMES S. DUFF,

Minister of Agriculture.

Toronto, 1909.

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MEMBERS FOR 1908-1909.

The following list of members includes all of those who are or have been connected with the Agricultural College, and have paid the annual membership fee for the present year. It is *quite distinct from the list of co-operative experimenters, of whom there are now about 6,000.*

Allan, F. W., Churchill.
Allen, R. J., Guelph.
Andrew, D. A., Lucknow.
Angle, P. E., Forks Road.
Auld, J. H., Guelph.
Austin, H. S., Lynn Valley.
Austin, R., Tottenham.

Bailey, C. F., Guelph.
Baldwin, M. M., Colchester.
Barnett, C. A., Rannoch.
Beardmore, Miss, Guelph.
Beckett, R., South Pelham.
Bennett, F. A., Box 117, St. Thomas.
Bergey, S. A., Mannheim.
Bethune, Dr., Guelph.
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Birdsall, F. E., Birdsall.
Black, N., Hawkestone.
Blanchard, B. H. C., Baddeck, N. S.
Bland, A. G., Kelowna, B.C.
Boddy, R. A., Guelph.
Bosman, A. M., Pretoria, S. A.
Bradt, E., York.
Bray, R. N., Nashville.
Breckon, W. D., Bronte.
Broderick, A. D., St. Catharines.
Brodie, G. A., Bethesda.
Broome, A. H. S., Hersham, Eng.
Brown, R. W., Jordan Harbour.
Brush, G. H. R., Owatonna, Minn.
Buchanan, D., Florence.
Buchanan, J., Guelph.
Buchanan, C. W., Florence.
Bunting, T. G., St. Catharines.
Burns, J. H., St. Marys.
Burwash, W., Baltimore.
Butler, Gerald C., Peveral, Eng.

Caesar, L., Guelph.
Callister, G., Reading, Eng.
Cameron, E. M., Toronto.
Campbell, John A., Simcoe.
Campbell, W. N., Victoria, B. C.
Campbell, M. A., Zimmerman.
Campbell, A. D., Strathroy.
Cassel, C. M., New Dundee.
Channon, G. C., Oakwood.
Cherry, P. A. B., Guelph.
Chessor, W., Guelph.
Christie, G. I., LaFayette, Ind.
Clancey, R. A., Guelph.
Clark, G. H., Ottawa.
Clark, A., Guelph.
Clark, T. O., Calgary, Alta.
Clarkson, F. L., Sweaburg.
Clemens, R. H., Berlin.
Clement, F. M., Virgil.
Cleverly, H. S., Bayonne, N.J.
Clowes, F. A., Simcoe.
Coben, Henry, Kinmount.
Coglan, M. F., Guelph.
Coglan, R. B., Bath.
Cohoe, D. P., New Durham.
Coke, E. F., Lynhurst, Jamaica.
Coke, J., Erin.
Coleman, H. W., Inkerman.
Collins, G. W., Guelph.
Conlin, W. P., Eldorado.
Cooley, R. B., Cannifton.
Cooper, A. R., Buffalo, N.Y.
Coulson, C., Foxboro.
Cowie, A. J., Caledonia.
Creelman, G. C., Guelph.
Crawford, E. A., Guelph.
Crow, J. W., Guelph.
Culp, S. H., Vineland.
Culp, A., Vineland.
Cunningham, G. C., Oil Springs.
Curtis, J. C., Virden, Man.
Cutler, G. H., Roleau, Sask.

Daly, W. H., Holland Landing.
Davidson, D., Birch Hills, Sask.
Davis, H., Woodstock.
Day, W. H., Guelph.
Day, G. E., Guelph.
Deachman, R. J., Vancouver, B.C.
Dean, H. H., Guelph.
Dempsey, P. E., Trenton.
Dennis, Jas. R., Weston.
Dent, T. R., Woodstock.
De Roo, J., Guelph.
Derrick, H. C., Merrickville.
Diaz, G., Guelph.
Diaz, R., Guelph.
Dorrance, H. A., Seaforth.
Duff, H. C., Dobbington.
Duncan, R. S., Truro, N. S.
Dunkin, G. S., Norwich.

Eastham, J. W., Guelph.
Edgar, F. G., Toronto.
Edwards, S. F., Guelph.
Ellerby, C. W., Woodbridge.
Elliott, G. S., Tillsonburg.
Ellis, F. E., Norwich.
Elton, Cecil, Cowley, Alta.
Emigh, C., Holbrook.
Emmerson, W. W., Foxboro, Ont.
Esmond, C. W., Winnipeg, Man.
Evans, J. Guelph.
Evens. W. A., Randolph.
Ewing, A. A., Englehart.

Fairbairn, J. B., Guelph.
Falconer, J. M., Guelph.
Farlinger, W. K., Morrisburg.
Ferguson, Jas., Dalmeny.
Filson, H. S., Stella.
Finch, A. C., Kingsmill.
Fleming, F. A., Toronto.
Forsyth, F., Glasgow.
Foster, N., Toronto.
Francis, J. F., Burford.
Freek, E. M., Barrie.
Friar, G. M., Guelph.
Fulmer, H. L., Guelph.

MEMBERS FOR 1908-1909.—*Continued.*

Galbraith, C. A., Hornby.
Galbraith, A. J., Hornby.
Gamble, W. P., Guelph.
Gandier, S. H., Lion's Head.
Gooldhorn, J. T., Guelph.
Goodchild, Andrew, Craigleith.
Graesser, F., Guelph.
Graham, W. R. Guelph.
Graybiel, M. M., Burnaby.
Green, R. G., Agincourt.
Green, R., Oak Leaf.
Greenshields, M., Black Lake, Que.
Greenwood, J., Toronto.
Grimmer, N. N., Penden Island, B.C.
Grisdale, J. H., Ottawa.
Gunn, R. E., Beaverton.

Haigh, Ethan, Mount Albert.
Hall, T. S., Ariss.
Hamer, R. S., Perth.
Hand, J. A., London.
Harcourt. R., Guelph.
Harley, L., Harley.
Harries, J. F., Guelph.
Hart, F. C., Galt.
Henderson, I. B., Hampden.
Henry, G. S., Oriole.
Herner, M. C., Mannheim.
Hermann, O. A. M., Big Fork.
Heurtley, E. W., Wilmer, B. C.
Hibberd, G., College Park, Maryland.
Hopkins. E. S., Lindsay.
Houser, H., Camden.
Howell, J. S., Jerseyville.
Howes, A., Harriston.
Howes, E. A., Guelph.
Howitt, J. E., Guelph.
Hubbard, W. W., St. John, N. B.
Hunt, William, Guelph.
Hutchinson, A., Mount Forest.
Hutt, H. L., Guelph.

Jack, Jas., Paris.
Jackson, W. D., Fulton.
Jarvis, C. D., Storrs, Conn.
Jarvis, T. D., Guelph.
Jenkins, R. M., Vs., Todmorden.
Jenkinson, R. H., Wexford.
Johnson, D., Myrtle.
Jonnson, G. T., Grafton.
Jones, D. H., Guelph.
Jones, J. W., Pownam, P.E.I.
Joubert, M J., Agr. Dept., O.R.C., S.A.
Jull, M. A., Morgantown, W. Va.

Keegan, H. L., Dublin, Ireland.
Kelly, W. A. Aldboro.
Kelso, M., Guelph.
Kennedy, S., Apple Hill.
Keppy Robt. A., Spence.
Kewley. H. D., Sarnia.
Kidd, S. E., Burritt's Rapids.
King, V., Guelph.
Kitchen, Erle, St. George.
Kitchen, A. F., St. George.
Klinck, L. S., Macdonald College, Que.
Klinck, C. R., Guelph.
Knapp, J. S., Merrickville.
Knauss, H. L., Detroit, Mich.

Knight, A. A., Brackenrig.
Kyono, J., Southampton, N. Y.

Laird, J. O., Blenheim.
Laughland, J., Hartney, Man.
Lawson, J. D., Guelph.
Levens, H., Chisholm.
LeClair, J. M., St. Therese, Que.
Lehman, Dr. A., Wooster, Ohio.
LeLacheur, G., Macdonald College, Que.
Lennox, W. J. W., Newton Robinson.
Lewis, E., Essex.
Lick, E., Oshawa.
Light, P., Hensall.
Logsdail, A. J., London, England.
Lord, S. A., Guelph.
Lucas, W. T., Mission Jct., B. C.

Marcellis, B. N., North Winchester.
Main, C., Sheffield.
Marsh, G. Fred, Albany, N. Y.
Marryat, U. G., Alix, Alta.
Martin, L. R., Jordan Harbour
Martindale, F. R., York.
Mason, T. H., Rodney.
Mason, A. W., Guelph.
Michaud, G., Ottawa.
Middleton, M. S., Vernon, B. C.
Miller, T. E., Bridgeburg.
Mogg, A. O. D., Guelph.
Monkman, R. K., Toronto.
Monteith, Hon. N., Stratford.
Montgomery, C. G., Ranfurly, Alta.
More, Jas., Kirkton.
Morewood, Jno. R., Englewood, N. J.
Mortimer, R. E., Collingwood.
Munro, W. A., Morrisburg.
Murray, Chas., St. John's, Newfoundland.
Murray, Jas., Brandon, Man.
Murray, R. H., Avening.
MacLennan, J. F., Bellows Falls, Vt.
McAleer, H. A., Philadelphia, Pa.
McArthur, M., Gobles.
McCalla, G. B., St. Catharines.
McCarthy, D. J., Kingston.
McCready, S. B., Guelph.
McCulloch, A. C., Epsom.
McDiarmid. H. S., Fingal.
McDonald, J. C., Montreal, Que.
McEwan, C. F., Byron.
McFadyen, C., Caledon.
McIlquham, J. M., Lanark.
McKenney, A., Essex.
McKenzie, D. A., Lindsay.
McLaren, A., Edinburgh, Scotland.
McLennan, C. M., Chicago, Ill.
McMeans, A., Guelph.
McMillan, H. R., Ottawa.
McMillan, A., Dutton.
McRae, F. C., Beaverton.
McTaggart, A., Guelph.
McVannel, A. P., Picton.

Nancekivell, J. H., Ingersoll.
Neff, E. F., Hamilton.
Neville, S. J., Cottonwood, Sask.
Newell, C. A., Kilbride.
Newman, L. H., Ottawa.

MEMBERS FOR 1908-1909.—*Continued.*

Nicholson, Chester, Mount Forest.
Nunnick, F. C., Scotland.

Orser, O., Kepler.
Orvis, W. G., Dryden.
Ostrum, H., Edswalla, Sweden.
Owen, W. H., Hull, Eng.

Packard, E. W., Brockton, Mass.
Palmer, E. B., Carlyon.
Palmer, C. L. S., Guelph.
Palmer, F., Victoria, B. C.
Palmer, W. E., Marshville.
Partridge, A. W., Crown Hill.
Pate, A. W., Brantford.
Peart, H. S., Jordan Harbour.
Petch, E. C., Caledon.
Pethick, W. H., Antigonish, N. S.
Phillips, A. E., Rossmore.
Pilsworth, R. H., Guelph.
Powell, F. T. S., Ruddell, Sask.
Putnam, G. A., Toronto.

Ralph, C. H., Guelph.
Ramage, Jas., St. Helens.
Ramsay, R. L., Bladworth, Sask.
Raynor, T. G., Ottawa.
Rebsch, C. C., Peachland, B. C.
Reed, W. J., Reid's Mills.
Reed, R. M., Cleveland, Ohio.
Reed, F. H., Regina, Sask.
Reeves, F. S., Guelph.
Reeves-Palmer, T., Wilsonville.
Reid, Peter, Chateauguay, Que.
Rettie, J. E., Living Springs.
Reynolds, J. B., Guelph.
Rice, F. H., Berlin.
Rice, E. L., South Swansea, Mass.
Riley, Jr., J. J., Graham, Que.
Robb, O., Sheffield.
Robertson, G. A., St. Catharines.
Robertson, D. M., Victoria West, B. C.
Robinson, E., Guelph.
Rogers, C., Guelph.
Ross, J. G., Montreal, Que.
Ross, H. E., Strange.
Ross, W. H., Beaverton.
Ross, W. A., Guelph.
Row, Chas. A., Langhorne, Pa.
Ryley, A. L., Lethbridge, Alta.
Ryrie, H. S., Oakville.

Salkeld, D. G., Goderich.
Sanders, G. E., Urbana, Ill.
Sanders, R. G., Tillsonburg.
Schartow, C. H., Toledo, Ohio.
Schuyler, C., Brantford.
Schuyler, R., Jarvis.
Scott, H. W., Lancaster.
Scott, W. R. M., Toronto.
Shepherd, F., Bloomingdale.
Shibley, C. S., Harrowsmith.
Shields, J. M., Smith's Falls.
Shorthill, J. R., Ballinafad.
Shuh, C. H., Waterloo.
Sibbald, Jr., W., Sutton West.
Sinha, S., Guelph.
Sirett, A. W., Rosseau.
Slater, J. A., Galt.

Smith, R. B., Columbus.
Smith, W. H., Chatham.
Smith, A. S., Chesterville.
Smye, G. C., Ayr.
Snyder, A. A., Blair.
Sorley, J. N., Cumming's Bridge.
Spear, W. R., Cobourg.
Spencer, J. B., Ottawa.
Spohn, H. B., Ancaster.
Springer, S., Guelph.
Squirrell, W. J., Guelph.
Sterling, J. H., Eglinton.
Stewart, P., Beaverton.
Stratton, R. W., Guelph.
Strong, W. J., Peveral, England.
Summerby, W. L., Russell.

Taylor, F., Cumberland Mills, Que.
Taylor, G., Guelph.
Thom, C. C., Guelph.
Thompson, Hugh, Jr., Magnetawan.
Tomè, A., Guelph.
Tomè, N., Guelph.
Toole, W., Whitevale.
Toole, A. A., Mount Albert.
Treherne, C. R. C., Guelph.
Trethewey, J. E., Port Hammond, B. C.
Tucker, H. S., Chapman.
Turney, A. G., Saventhen, Belgium

Underhill, M., Richard's Landing.
Upton, H. E., Peabody, Mass.

Van Sickle, P. O., Trinity.
Varcoe, J. R., Carlow.

Wade, R. W., Guelph.
Wallbridge, F., Belleville.
Walker, Wm., Guelph.
Walker, C. T., Haysville.
Warren, F. B., Gamebridge.
Waters, B. J., Ivan.
Weber, M., Winterbourne.
Webster, H. B., Science Hill.
Webster, C. A., Dundas.
Weir, E. A., Randwick.
Wells, E. A., Chilliwack, B. C.
Westover, C. A., Freleighsburg, Que.
Whale, I. B., Goldstone.
White, E. W., New Westminster, B. C.
Whiteside, E. A., Guelph.
Whyte, M. I., Banbridge, Ireland.
Wiancko, A. T., LaFayette, Ind.
Wilkinson, P. J., Cambray.
Williams, W. E., Clandeboye.
Wilson, Stanley, Rolling Dam.
Wilson, R. H., Walter's Falls.
Wilson, J. Epsom.
Wilson, J. A., Mt. Elgin.
Wilson, E. E., Box 47, Caledon.
Winslow, R. M., Victoria, B. C.
Wood, C., Guelph.
Wright, W. H., Delaware.
Wright, C. H. Agassiz, B. C.

Young, G. H., Waubuno.

Zavitz, C. A., Guelph.
Zavitz, E. J., Guelph.
Zavitz, Howard V., Coldstream.

Ontario Agricultural and Experimental Union.

OFFICERS FOR 1908-1909.

President	J. O. LAIRD, Blenheim, Ont.
Vice-President	G. S. HENRY, Oriole, Ont.
Secretary and Editor	C. A. ZAVITZ, Agricultural College, Guelph.
Assistant Secretary	J. BUCHANAN, Agricultural College, Guelph.
Treasurer	H. L. HUTT, Agricultural College, Guelph.
Directors	G. C. CREELMAN, F. R. MALLORY, R. S. HAMER, G. S. CARPENTER, W. L. LENNOX, F. C. NUNNICK.
Auditors	J. B. FAIRBAIRN AND W. J. SQUIRRELL.

COMMITTEES ON EXPERIMENTAL WORK.

Agriculture	Prof. C. A. ZAVITZ, (Director), J. BUCHANAN, W. J. SQUIRRELL, A. E. WHITESIDE.
Horticulture	J. W. CROW, (Director), H. S. PEART, A. MCMEANS.
Poultry	Prof. W. R. GRAHAM, (Director), G. A. ROBERTSON, M. C. HERNER.
Forestry	E. J. ZAVITZ, (Director), H. R. MCMILLAN, E. C. DRURY.
Chemistry	Prof. W. P. GAMBLE, (Director), GEO. MCCALLA, R. S. HAMER.
Schools	S. B. MCCREADY. (Chairman). H. L. HUTT, (Horticulture). C. A. ZAVITZ, (Agriculture). E. J. ZAVITZ, (Forestry). E. A. HOWES, (Nature Study)

TREASURER'S REPORT, 1908.

Receipts.

Membership fees (387 at 50c.)	$193 50
Government grant	2,750 00
Total	$2,943 50

Expenditure.

Balance due treasurer last year	$104 35
Interest on money borrowed...	4 50
Agricultural experiments	1,555 00
Horticultural experiments	844 49
Chemical experiments	45 88
Part expenses annual meeting 1907	51 75
Part expenses annual meeting 1908	112 00
Meeting of the executive	6 85
Total	$2,724 82
Balance on hand	218 68
	$2,943 50

We, the undersigned auditors, declare that we have examined the Treasurer's accounts and find them correct.

W. J. SQUIRRELL,
J. B. FAIRBAIRN,
Auditors.

December 3rd, 1908.

Ontario Agricultural and Experimental Union.

ANNUAL MEETING.

The thirtieth annual meeting of the Ontario Agricultural and Experimental Union was held at the Ontario Agricultural College, Guelph, on Monday, Tuesday, and Wednesday, December 7th, 8th, and 9th, 1908.

The President of the Union, Mr. G. A. Brodie, B.S.A., Bethesda, Ont., presided over the regular sessions, and Mr. G. C. Creelman, President of the College, at the annual supper on Tuesday evening

SECRETARY'S REPORT.

By C. A. Zavitz, Professor of Field Husbandry, Guelph, Ont.

The Board of Control of the Ontario Agricultural and Experimental Union has held two meetings since their appointment one year ago, one in December, 1907, and one in September, 1908.

About 30,000 copies of the Annual Report of the Association for 1907 were printed and distributed by the Department of Agriculture in the early part of the present year. We are pleased to state that as the report was issued considerably earlier than usual, it reached the experimenters and others several weeks before the spring opened up, and thus gave good service to the farmers generally.

In 1908, co-operative experiments were conducted on about 8,000 farms throughout Ontario in the departments of Agriculture, Horticulture, Forestry, Poultry-raising, and Agricultural Chemistry. It is probably safe to say that the co-operative work was more extensive in 1908 than in any year previous. I believe it is also true that the work has been more thoroughly done and will probably exert even a greater influence than that of any one year during the twenty-three years in which the Experimental Union has been carrying on its present system of co-operative experiments.

In Agriculture, there are now no less than thirty-eight separate experiments which cover all the most important farm crops which are grown in the Province of Ontario, and which deal with varieties of crops, mixtures of grains and grasses, the application of commercial fertilizers, and different methods of cultivating the soil. In this department, the number of experimenters in 1908 reached 4,420, and that for the twenty-three years, from 1886 to 1908, inclusive, 49,485. The work in Agriculture has certainly been very extensive in its operations and influential in its results.

In Horticulture, the co-operative work of the past two years was decidedly more extensive than formerly. During these years it has included experiments with vegetables, as well as those with small and with large fruits. The total number of co-operative experimenters in Horticulture for the fifteen years from 1894 to 1908, inclusive, is 9,563.

The departments of Forestry, Agricultural Chemistry and Poultry-raising have all been doing good work during the year. A report of each of the

former two branches of the work will be presented at the annual meeting. As the work in the Poultry department, however, is yet quite incomplete, the report will be held over for another year. Owing to lack of time on the part of the members of the committee on Apiculture, no work has been accomplished during 1908.

The ex-students of the College and other experimenters throughout Ontario deserve great credit and sincere thanks for the excellent work which they are doing, not only for themselves and their neighbouring farmers, but also for the general improvement of the agriculture of our country. It is stated, on good authority, that the output of Ontario farms has doubled in fifteen years. The Experimental Union has had a marked influence in bringing this about, as well as assisting greatly in the education of the people.

The Experimental Union has an excellent corps of experimenters. Some of these combine the practical experience obtained on the farm, the educational training secured at the Agricultural College, as well as the special training furnished by successfully conducting co-operative work on their own farms for a number of years in succession. Some of the men have furnished good reports of successfully conducted experiments in each of a dozen years.

It is probably not too much to say that the Experimental Union has exerted a considerable influence in developing a deeper interest in the Agricultural College, at which institution about 1,000 students attend and 40,000 farmers visit annually. It is gratifying to know that the Experimental Union is exerting a wholesome influence in many ways. May the work of the past encourage us to press forward in a humble, but hopeful and persistent manner to better and greater things in the future, and to thus make our work more perfect and more worthy of imitation.

PRESIDENT'S ADDRESS.

By G. A. Brodie, B.S.A., Bethesda, Ont.

We are here to celebrate the thirtieth anniversary in the organization of the Experimental Union. In so doing we extend a hearty welcome to the students, ex-students, and staff of this institution, to the Institute workers and all other visitors who are with us. We welcome you here. Let us join hands and make the thirtieth re-union the best on record.

We are here to discuss some of the problems affecting that great and most important calling which we are proud to say is ours. We congratulate the College staff on their record attendance of students and the efficient work that is being accomplished.

The year has not passed without its peculiar lessons, commencing as it did with almost a financial crisis in business and trade circles. It was, however, only through the daily press that farmers learned there was a depression, thus proving that agriculture is not only our great basic industry, but the most stable industry in the country. True, the farmers of the West did feel the financial stringency to some extent, owing largely to their greed for land and doing too much business on the credit plan, but in Ontario, save in a few isolated sections, there was little change from conditions which had prevailed for ten years. Possibly there has never been such a series of successful years as the farmers of Ontario have lately enjoyed, due, no doubt, to several causes such as, better transportation facilities in which we

share in the world's great markets; industrial activities and general expansion along all lines, and the settlement of the great West, which by helping to build up our cities has developed the home market. Climatic conditions have also been a great factor as well as the dissemination of knowledge through Farmers' Institutes and the agricultural press. But possibly the greatest work has been done by the Ontario Agricultural College, including that accomplished by the Experimental Union in introducing new varieties and thereby increasing the yield per acre. I am glad to say, too, that the Union is now engaged on a still more important undertaking in the creation of new varieties from which new records are expected. In the past year eight thousand farmers throughout Ontario were conducting co-operative experiments, and on four thousand, four hundred and twenty farms experiments were conducted in agriculture alone. Imagine what this means in the upbuilding of agriculture throughout the Province, each experiment being an object lesson and guide to the farmers of the locality surrounding the experimental plots, and from this source new seed grains are obtainable that yield much more per acre than the older varieties. Not only in agriculture have experiments been conducted, but also in horticulture, forestry, poultry raising, bee keeping and agricultural chemistry. Thanks are due to the Union, also, for its example in proving the benefits of co-operation and its great educational value to the country at large, yea! even extending its fruits to foreign lands.

The Union is advancing at a rapid pace and we must so continue. We must remember we are living in a fast age; everything is directed towards speed, the race horses, autos, railways, trolleys, steamboats, and now the airships, are all trying to make a new record. In professional, scientific, business and trade circles there is the same rush generally directed on lines to get rich quickly. In such times it is well to pause a moment and consider just where we are at, and what are the conditions affecting the farmer at the present time.

Possibly one of the greatest problems affecting agriculture to-day is the increase of noxious weeds throughout the whole country, decreasing the annual yield possibly 20 per cent., which means a yearly loss of many millions of dollars. Land is valuable according to its producing qualities, and noxious weeds not only reduce the yield, but also the value of farm property. Where perennial sow thistle is prevalent it seems to me that unless some co-operative measure is put into force we will never get rid of this terrible evil. Could not the Union outline a course of experiments with a view of ascertaining the best methods of controlling those worst weeds that really threaten the extermination of many good industrious farmers. I am sure they will find many anxious to carry these out and report at our next meeting. The Union might also champion the cause of intensive farming, for we must farm better. In the race for wealth there seems a craze for large farms, many thinking this means more money. This may be true for a year or two, but in the end is a failure. Farming is degenerating. Our forefathers were better farmers than we are. We seem to have caught the Western idea, and are trying to mine our land instead of farm it. Our forefathers when they settled here, worked hard, cleared the land, built roads and improved their surroundings, because this was to be their home. The Western idea of settlement is to accumulate all the land possible, make a fortune and get out. The same idea now prevails here—get rich and retire. These conditions are to a great extent responsible for poor farming. We in Ontario congratulate ourselves on being the leaders of the world in agriculture. Such is far from the truth. The old countries can teach us many

lessons. They practise intensive farming, and if we wish to occupy the proud position of leaders in agriculture, we must simply take the lesson and fall in line with intensive farming.

The labor situation improves slowly. We should encourage immigration of the proper sort, plan our work carefully, and use modern implements. If we consult our own interests we will oppose all bonus and bounty fed industries that on account of their bonus or bounty can outbid the farmer in the labor market, the bounty in some cases being sufficient to pay the entire wages of the industry. I am not one who believes that it is part of the Divine plan that the prosperity of one calling should be built on another's misfortune. We ask no favours, but demand equal rights.

The last season has been a dry one and we must again expect a series of dry years and provide ourselves with plenty of green fodder for fall use. The drought has taught us another lesson. The four hundred million loss Michigan has just sustained in forest fires, should be a warning to Ontario with its millions of acres of forest lands. Our Government cannot apply laws too rigid for the safety of our forests and those living in close proximity. Our losses must have reached millions of dollars last season alone, and there is nothing more deplorable than the sight of a vast country swept by forest fires. Another point to be remembered is that the world's timber supply is pretty well exhausted, and in a few years Canada alone will be the great exporting country, and her timber the source of vast wealth.

We must congratulate our former Minister of Agriculture on the selection of an Experimental Farm in Northern Ontario, which is bearing fruits in the advertising of Northern Ontario's rich agricultural lands even at the present day. We farmers of Ontario should be thankful for the great heritage of these rich agricultural lands now being opened for settlement.

The past year proves the part that electricity is destined to play on the farm in the near future. The harnessing of Niagara Falls and the transmission of power throughout Ontario is no longer a dream, but a reality. The application of power to agricultural operations seems likely within the next ten years, and this new method will carry great changes with it. The tapping of radial electric railway lines for power to run stationary farm machinery is said to be an accomplished fact in several of the States. It seems to me that farmers should be looking into this new enterprise and show claims as good as any for cheap power. We also gladly note the new fertilizer, lime-nitrogen, that no doubt will work wonders in the future agriculture of Canada. The day has arrived even in this new country when special fertilizers have a place and, like the older lands, we too must feed our crops. We also gladly welcome the introduction of rural mail delivery, which, in conjunction with the rural telephone systems, makes us no longer an isolated people.

After referring to the recent general elections, and regretting the fact that so few farmers were returned, the speaker proceeded to say:—

For years all farmers have realized and agree in saying that their greatest need is co-operation and union. There have been several attempts to organize, and possibly the Grange has done about as much as any towards union. However, it appears to me, that the farmers must organize on broader lines than has yet been effected. Let there be a grand union of the Grange, Experimental Union, Farmers' Institutes, Live Stock and Dairy Associations, Vegetable, Fruit, Poultry and Beekeeping Associations, and all other agricultural organizations, and in this great farmers' council discuss a scheme for a gigantic Farmers' Union with co-operation as the basis. It is co-operation, or else to be trampled upon. All other callings are joined

in unions to protect themselves, while we day in and day out plod to feed those who use their brains to get our money. Is the farm home worth protection? Are agricultural interests worth protecting? If so, rally around the co-operation flag. Let the college teach it. Let the Union proclaim it, the Farmers' Institutes, Live Stock and Dairy Meetings, and everything agricultural shout for "Co-operation and Union," and we will have it. Then, and not until then, will farmers be fully represented in our parliaments, and exercise their proper influence on all those great questions which affect our country's welfare.

J. O. LAIRD: I am very much pleased with the address we have just received from our President. He has given the matter a good deal of thought, and has given out some suggestions on which we might work with profit.

One point that I think is very important is the eradication of some of the weeds, especially of the sow thistle. I think if some experiments along that line could be thought out, farmers would be glad to take them up, and they could be carried on in connection with the Experimental Union work. We must engage in intensive farming in order to get rid of weeds, and I think that will eradicate them quicker than anything else.

This year has been rather a dry season and we should take a lesson from it. We should cultivate more thoroughly and keep the cultivator going from the first to the last of the season, and in doing so we will be rewarded for our labours.

The introduction of fertilizers, I believe, is a problem we will have to face. I think they will be commonly used in Ontario before ten years have passed.

The President spoke of the rural free mail delivery and the rural telephones which have been introduced into many counties. I am pleased to say that in the County of Kent we have a very fine rural telephone, and I think that the rural free mail delivery and telephone systems will certainly make farming a most pleasant occupation. We are less isolated than we were years ago.

RESULTS OF CO-OPERATIVE EXPERIMENTS IN AGRICULTURE.

BY C. A. ZAVITZ, PROFESSOR OF FIELD HUSBANDRY, O.A.C., GUELPH.

The co-operative work in Agriculture, conducted through the medium of the Ontario Agricultural and Experimental Union, has been more extensive during the past year than at any time previous. We are greatly pleased with the continued interest in this important work throughout the country, and with the enthusiasm by which it is carried out. During the past year, no less than 5,159 applications for experimental material were received. Of this number, 4,420 ex-students of the College and other farmers were supplied with everything necessary for conducting the co-operative experimental work. Owing to lack of help, finances, and material, we were unable to supply 739 applicants with the material for experimental purposes, and are holding these names over until another year. We are pleased to report, however, that the number of actual co-operative experimenters in 1908 was 390 in excess of that last year.

The weather conditions, on the whole, have been favourable for experimental work during the past year, and the committee is pleased to state that a greater number of valuable reports have been received in 1908 than in any year previous. The experiments with oats, winter wheat, barley, field peas, sweet corn, potatoes, and fertilizers were particularly good during the past year, but those with varieties of fall turnips and with different methods of cultivation of mangels were so poor that no tabulated data can be presented in this report. Owing to the exceptionally dry weather in the latter part of the summer in some sections of Ontario, the good reports from swede turnips, mangels, rape, kale, vetches, etc., are not very great in number. We are greatly pleased with the character of the work of a large number of our experimenters. They deserve great credit for successfully conducting the various experiments, and farmers owe much to these experimenters for the valuable reports which they have furnished and which are here presented in a summary form.

As the co-operative experiments have been conducted during the past year in every county and probably in every township of the Province, the results should be not only of local but also of general interest and should give service of great value. Not only does the Experimental Union furnish financial aid to the experimenters themselves and to the country as a whole, but it also encourages neatness and method in work, close observation, accurate calculation, thoughtful inquiry, and other important agencies which help so much in the education of the people.

For the benefit of those who are not familiar with our system of co-operation, it may be well to state that it is to a large extent the outgrowth of the experimental work done at the College, and that it is principally based on the results of that work. The experimental work in field agriculture was started at the College in 1876, and since that time it has gradually developed along various lines, until at present about two thousand plots are used annually in growing grains, fodder crops, grasses, clovers, roots, and potatoes; in testing manures and fertilizers, etc., with the object of obtaining information regarding the best varieties; the most productive selections of seed; the best time to sow the various classes of crops; the most improved methods of cultivation; the best mixtures of seed for the production of grain, hay, anl pasture; the best methods of maintaining and increasing soil fertility, etc. Since the beginning of this work, over two thousand varieties, of farm crops have been tested, and the best among these are now used for distribution in connection with the co-operative work of the Experimental Union, in testing varieties, fertilizers, methods of cultivation, mixtures, etc.

In the spring of each year, circulars on the co-operative work are distributed by the agricultural committee appointed by the Union. These circulars give a list of all the experiments for which material can be furnished. They are sent by mail to the members of the Experimental Union; to the experimenters of former years who have done satisfactory work; to leading farmers whose names have been suggested by secretaries of Farmers' Institutes, secretaries of Agricultural Societies, principals of Collegiate Institutes, and inspectors of Public Schools. They are also sent to all persons asking for information regarding the co-operative work; and to all the newspapers of the Province. In this way the work is brought to the notice of a very large proportion of the farmers of Ontario. The following gives a list of the co-operative experiments in agriculture, conducted throughout Ontario, in 1908.

CO-OPERATIVE EXPERIMENTS FOR 1908.

Spring Grain Crops.

	Plots.
1. Testing three varieties of Oats	3
2a. *Testing three varieties of six-rowed Barley*	3
2b. Testing two varieties of two-rowed Barley	2
3. Testing two varieties of Hulless Barley	2
4. Testing two varieties of Spring Wheat	2
5. Testing three varieties of Buckwheat	3
6. Testing two varieties of Field Peas	2
7. Testing Emmer and Spelt	2
8. Testing two varieties of Soy, Soja, or Japanese Beans	2
9. Testing three varieties of Husking Corn	3

Root Crops.

10. Testing three varieties of Mangels	3
11. Testing two varieties of Sugar Beets for feeding purposes	2
12. Testing three varieties of Swedish Turnips	3
13. Testing two varieties of Fall Turnips	2
14. Testing two varieties of Carrots	2

Forage, Fodder, Silage and Hay Crops.

15. Testing three varieties of Fodder and Silage Corn	3
16. Testing three varieties of Millet	3
17. Testing three varieties of Sorghum	3
18. Testing Grass Peas and two varieties of Vetches	3
19. Testing Rape, Kale, and Field Cabbage	3
20. Testing three varieties of Clover	3
21. Testing Sainfoin, Lucerne, and Burnet	3
22. Testing four varieties of Grasses	4

Culinary Crops.

23. Testing three varieties of Field Beans	3
24. Testing three varieties of Sweet Corn	3

Fertilizer Experiments.

25. Testing fertilizers with Potatoes	8
26. Testing fertilizers with Swede Turnips	6

Miscellaneous Experiments.

27. Sowing Mangels on the level, and in drills	2
28a. Testing two varieties of Early Potatoes	2
28b. Testing two varieties of medium ripening Potatoes	2
28c. Testing two varieties of Late Potatoes	2
29. Testing three grain mixtures for grain production	3
30. Testing three mixtures of Grasses and Clovers, for hay	3

Autumn Sown Crops.

31. Testing Hairy Vetches and Winter Rye as fodder crops	2
32. Testing three leading varieties of Winter Wheat	3
33. Testing five Fertilizers with Winter Wheat	6
34. Testing Autumn and Spring Applications of Nitrate of Soda and Common Salt with Winter Wheat	5
35. Testing two varieties of Winter Rye for grain production	2

Most of the plots were one rod wide by two rods long, being exactly one-eightieth of an acre in size. In former years some plots consisted of one-tenth acre and a few of one-half acre in size, but for most experiments these were found less satisfactory than the small plots.

For the following summary, only the results given in the most reliable reports were used. Many of these reports have been sent in by men who have had a large amount of practical experience on the farm; have had the advantages of a good education, and by means of conducting experiments in former years have become quite expert in the work. It should be remembered, however, that while only the good reports of carefully conducted experiments have been used for publication, many of those not included in the summary show that the individual experimenters must have obtained a considerable amount of value from the work. It frequently happens that, owing to some unavoidable accident, the experiment may have been injured to some extent so that the results could not be used in the general summary, and yet the experiment may have furnished useful lessons to the farmer conducting it. In all cases, experimenters obtain much more information from the work which they have carried on than can be given in a tabulated report.

Very carefully prepared instructions for conducting the co-operative work were furnished each experimenter in the spring of the year. While these instructions were not so elaborate but what they could be carried out in every detail, they were sufficiently comprehensive and specific to cover the important parts of the experiment in the search of reliable and valuable information, from a practical point of view. Besides various questions regarding the details of the experiments, the different experimenters were asked to give their decision as to the relative standing of the different varieties, mixtures, methods of cultivation, and fertilizers, taking everything into consideration bearing on the various phases of the experiments and on their own knowledge of their requirements regarding the soils of their farms, the systems of farming practised, the requirements of the markets, etc. The summary of the answers to this line of inquiry is presented in the tabulated results under the heading of comparative value.

Varieties and Mixtures of Grain Crops.

The co-operative experimental work, with varieties and mixtures of grain crops, as conducted by the Experimental Union in 1908, deals with those crops which were grown on no less than 5,757,333 acres throughout the Province during the present year. We believe that the work of the Experimental Union has had a very marked influence on the cereal crop production of Ontario during the past few years. It is also believed that the results which are presented in this report are of very great value to those farmers in Ontario who are at present living on those farms which comprise nearly six million acres devoted to the annual cultivation of cereal crops. In the table here presented, the yield of straw, as given in the second column, represents the total crop less the amount of grain, and therefore includes the chaff with the straw. The yield of grain is given in pounds and also in bushels per acre, in order that the results may be more clearly understood and that comparisons may be made between the different classes of crops as well as between the varieties of each class. Owing to the great variation in the weight per measured bushel of the different crops, it is easier to compare the results in pounds than in bushels per acre.

The average results of the successfully conducted experiments with varieties and mixtures of grain crops are presented in the following table:—

GRAIN CROPS, 1908.

Experiments.	Varieties	Comparative Value	Yield per Acre. Straw tons.	Grain lbs.	Grain bus.
Oats (115 tests)	Yellow Russian	100	1.26	1,578	46.42
	Irish Victor	99	1.19	1,531	45.04
	Daubeney	75	1.10	1,465	43.08
Six-rowed Barley (36 tests)	No. 21	100	1.15	1,638	34.13
	Mandscheuri	100	1.18	1,610	33.53
	Oderbrucker	70	1.20	1,517	31.60
Two-rowed Barley (8 tests)	Hanna	100	1.10	1,290	26.88
	Two-rowed Canadian	94	.81	930	19.38
Hulless Barley (10 tests)	Guy Mayle	100	2.50	1,794	29.91
	Black Hulless	80	2.53	1,540	25.67
Spring Wheat (15 tests)	Wild Goose	100	1.16	1,062	17.70
	Hungarian	88	.89	875	14.59
	Red Fyfe	81	.82	856	14.26
Buckwheat (8 tests)	Rye	100	1.86	1,455	30.32
	Silver Hull	95	2.02	1,185	24.68
Emmer & Spelt (9 tests)	Common Emmer	100	1.39	1,731	43.28
	Red Spelt	40	1.08	1,002	25.06
Winter Wheat (17 tests)	Imperial Amber	100	1.36	1,555	25.92
	Abundance	81	1.18	1,397	23.29
	No. 5 Red	69	1.19	1,332	22.20
Winter Rye (5 tests)	Mammoth White	100	1.57	1,904	34.00
	Common	67	1.47	1,602	28.60
Field Peas (53 tests)	New Canadian Beauty	100	1.52	1,641	27.35
	Early Britain	78	1.33	1,503	25.06
Field Beans (14 tests)	Marrowfat	82	.77	1,586	26.44
	White Wonder	100	.67	1,537	25.61
	New Prize Winner	65	.64	1,299	21.65
			Whole Crop.		
Corn for Grain (17 tests)	King Philip	93	7.49	2,594	46.33
	Compton's Early	100	7.53	2,421	43.23
	Genesee Valley	80	6.59	2,172	38.79
			Straw		
Mixtures (6 tests)	Daubeney Oats, 34 lbs. per acre; Mandscheuri Barley, 48 lbs. per acre	100	.97	1,580	......
	Siberian Oats, 34 lbs. per acre; Two-rowed Canadian Barley, 48 lbs. per acre	85	1.03	1,406	......
	Siberian Oats, 25 lbs. per acre; Two-rowed Canadian Barley, 35 lbs. per acre; Wild Goose Sp. Wheat, 22 lbs. per acre	67	1.04	1,320	......

Varieties of Oats. About two hundred and fifty varieties of oats have been under experiment at the Agricultural College within the past twenty years. New varieties have been introduced from time to time, and after

five years' tests the poorer kinds have been dropped and those which have given the most satisfactory results have been retained in the tests. Nearly all of the varieties here referred to have been grown at the College for at least five years in succession, while a few of them have been under test for nearly twenty years. By referring to the report of the Department of Field Husbandry at the Agricultural College for 1907, it will be seen that the Yellow Russian gave the highest yield of grain per acre of all the varieties grown for the five years previous. It will also be observed that the Irish Victor stood fifth in the average yield per acre of the fifty-nine varieties there reported. These two varieties, along with the Daubeney, were distributed throughout Ontario in the spring of 1908 for co-operative experimental work. The Yellow Russian and Irish Victor are medium in maturity and possess spreading heads of grain of very good quality. As the grain of the Yellow Russian, however, has a yellowish cast, it is probably not quite as good a selling variety as the Irish Victor, which has grain which is white. The Daubeney is about ten days earlier in reaching maturity than either the Yellow Russian or the Irish Victor. In weight per measured bushel, the three varieties do not vary greatly, but each produces grain which comes closely to the standard weight for oats in Ontario. The percentage of hull, however, of the Daubeney oats is exceptionally light, being only about 24 per cent. The grain of the Daubeney variety, therefore, is of very excellent quality, being superior to that of nearly all other varieties of oats in composition. The Daubeney has been used in the co-operative experiments over Ontario in each of six years, but the Yellow Russian and the Irish Victor varieties were distributed in 1908 for the first time. In the average results of carefully conducted experiments with these three varieties on one hundred and fifteen farms throughout Ontario, we learn that the Yellow Russian gave the highest yield per acre, the average being 46.4 bushels. This yield was about one and two-fifths bushels greater than that of the Irish Victor, and three and one-third bushels greater than that of the Daubeney. In popularity, however, there was but little difference between the results of the Yellow Russian and that of the Irish Victor.

Six-rowed Barley. The area devoted to the barley crop in Ontario has increased from 438,784 acres in 1898 to 734,029 acres in 1908. No other grain crop has increased in area to such a great extent during the last ten years as barley. This is undoubtedly due, to a certain extent, to the introduction by our College of the Mandscheuri barley, and after testing it at Guelph and finding its excellent characteristics, distributing the same throughout Ontario hrough the medium of the Experimental Union. The Mandscheuri barley ias thus been distributed throughout Ontario each spring since 1892. As iearly as we can ascertain, there are about 550,000 acres of the Mandscheuri ariety grown in Ontario at the present time. No. 21 barley is a selected train of the Mandscheuri which we started at the College a few years ago. t has been distributed throughout Ontario, and although it does not give very iarked differences from the Mandscheuri variety, it has, on the whole, given lightly better returns. In the report of the co-operative experiments over ntario in 1907, No. 21 barley slightly surpassed the Mandscheuri variety in ield of grain per acre, strength of straw, freedom from rust, early maturity, nd in general popularity. In 1908, it again surpassed the Mandscheuri in ield of grain per acre, but in general popularity it was very similar to hat variety. The No. 21 barley has a fine appearance, and usually stands p rather better than the Mandscheuri. It is certainly a very excellent train of barley. The Oderbrucker variety, which has been one of the closest ivals which we have had to the Mandscheuri is again surpassed by that

variety, as is the case in practically all experiments, both at the College and throughout Ontario.

Two-rowed Barley. The interest taken in two-rowed barley throughout Ontario is not great, as may be seen from the fact that we have more than four times as many good reports from the six-rowed as we have from the two-rowed varieties for 1908. It will be seen from the tabulated results that the highest yielding variety of two-rowed barley gave an average yield of nearly seven bushels per acre less than the No. 21 six-rowed, and over seven bushels per acre more than the Two-rowed Canadian, with which it was compared in the co-operative tests. Of the two-rowed barleys which we have grown at the College, the Hanna, which is a Russian variety introduced by the Department of Agriculture of the United States, has proven itself to be one of the very best kinds. It was distributed in connection with our co-operative work in 1908 for the first time.

Hulless Barley. Fully a dozen varieties of hulless barleys have been under experiment at the College. The Black Hulless is the oldest and best known variety in Ontario. It is, however, very weak in the straw and has not given as good results in yield of grain per acre as the Guy Mayle variety in the experimental work at the College. It will be seen from the average results of growing both the Black Hulless and the Guy Mayle in ten different localities throughout Ontario in 1908, that decidedly the greatest yield per acre was produced from the Guy Mayle variety, which was also very popular with the experimenters.

Spring Wheat. The three varieties of wheat distributed in the spring of 1908 represent two classes of grain. The Wild Goose is a durum wheat and is specially suitable for the production of macaroni, while the Hungarian and the Red Fife varieties are finer grained wheats which are used more extensively for flour production. The Hungarian wheat was secured from the Argentine Republic, and has given exceptionally high results at the College amongst the finer quality wheats, It was distributed throughout Ontario in the spring of 1908 for the first time. In the average of fifteen carefully made tests of spring wheat throughout Ontario in 1908, it will be seen that the Wild Goose heads the list in yield of both grain and straw, and also in popularity. It is followed by the Hungarian, which has given slightly better all-round results than the Red Fife. These results correspond almost exactly with those obtained at the College with these three leading varieties of spring wheat. The Red Fife is well known throughout Ontario, and the Western Provinces of Canada, and needs no description, but forms a good standard with which to compare the other varieties.

Buckwheat. Although there is usually not as great a demand for buckwheat for experimental purposes as with most of the other crops, it will be seen that we have eight good reports of experiments conducted with this crop throughout Ontario during the past season. The Silver Hull buckwheat has been grown at the College for many years with very good results. The Rye, Sand, or Notched buckwheat, although considerable grown in some countries, has not been used in the experiments at the College until within the last few years, during which time it has surpassed the Silver Hull in yield of grain per acre. The Rye buckwheat was distributed throughout Ontario this year for the first time, and the results show that it surpassed the Silver Hull variety in yield of grain per acre by more than five bushels and also that it surpassed the Silver Hull in popularity with the experimenters. The Rye buckwheat is grown quite extensively in the Province of Nova Scotia.

Emmer and Spelt. These represent two classes of wheat which have been studied more particularly for the production of feed for farm stock than for the production of flour. When threshed there is not a clear separation of the grain and the chaff, but both come from the machine together and are afterwards ground into meal. The Emmer usually possesses about 22 per cent. of hull or chaff, and the Spelt about 30 per cent. It will therefore be seen that the amount of hull on the Emmer is considerably less than that on the average variety of oats, which usually runs about 30 per cent. Emmer and Spelt have been distributed throughout Ontario for co-operative experiments in each of the past five years, the following being the yields per acre from the two varieties respectively: 1904, 2,274 lbs., 1,263 lbs.; 1905, 1,589 lbs., 1,276 lbs.; 1906, 1,578 lbs., 1,106 lbs.; 1907, 1,768 lbs., 952 lbs.; and in 1908, 1,731 lbs., and 1,002 lbs. It will therefore be seen that the Emmer has surpassed the Spelt in yield of grain per acre to a very marked extent. In both the experiments at the College and also throughout Ontario, the Common Emmer forms a very close rival indeed to the best varieties of oats and the best varieties of barleys in yield of grain per acre. In fact Emmer has surpassed both of these grains on several occasions.

Winter Wheat. Three varieties of winter wheat were distributed last autumn to those farmers who wished to test some of the leading varieties on their own farms. The Imperial Amber was distributed for the ninth time, the Abundance for the second time, and No. 5 Red for the first time for these co-operative experiments. Not only did the Imperial Amber give the greatest yield per acre in the co-operative experiments throughout Ontario in 1908, but it also came first in popularity with the experimenters. This variety has produced very excellent results in the experiments at the College. Dawson's Golden Chaff, which we distributed for the co-operative experiments in each of twelve years, and which is probably grown more extensively in Ontario at the present time than all other varieties of winter wheat combined, has not been included in the co-operative tests since 1906.

Winter Rye. Winter Rye has proved to be a very hardy and good yielding crop at the College. The Mammoth White variety has given very good results indeed. It will be seen from the co-operative experiments over Ontario in 1908, that the Mammoth rye has also made an excellent record, with an average of 34 bushels, while that of the common rye gave 28.6 bushels per acre. It must be remembered, however, that the number of successfully conducted experiments is not large, being only five in 1908.

Field Peas. For a few years, we distributed field peas only to those districts where the pea weevil has not yet been found, but in 1906, and in each of the two following years, owing to the fact that the pea weevils were becoming less troublesome, it was decided to send peas for experimental purposes to all parts of the Province from which applications were received. Consequently, we received for this experiment fifty-five good reports in 1906, forty-two good reports in 1907, and fifty-three good reports in 1908. These reports are more numerous than those obtained for the few years previous to 1906. On averaging the results of the fifty-three good reports which came to hand this year, we find that the New Canadian Beauty stands first in yield of grain with an average of 27.35 bushels per acre, which is followed by the Early Britain with an average of 25.06 bushels per acre. We have compared these two varieties over Ontario in each of six previous years, and the average results show that in five of these years the Early Britain surpassed the Canadian Beauty variety in yield of grain per acre. This variety, however, gave unusually low results in 1908, when compared with the New Canadian Beauty. The New Canadian Beauty is a large

white pea of good quality and is very saleable. The Early Britain variety is brown in color, and not as round in the grain as the New Canadian Beauty. It will be noticed that the best variety of peas surpassed the best variety of oats and barley in the experiments throughout Ontario in 1908. This was also true in 1907, but in 1906, the barley and the oats considerably surpassed the peas in yield of grain per acre.

Field Beans. The field beans gave very good results throughout Ontario in 1908, the Marrowfat variety giving upwards of 26 bushels of grain per acre. Although this variety surpassed the White Wonder by nearly one bushel per acre, it was not as popular with the experimenters as the last named variety. The Marrowfat produces large white beans, and both the White Wonder and the New Prize Winner, small white beans.

Corn for Grain. There are in Ontario about three hundred thousand acres used each year for the growing of corn for the production of grain. This area is still rather larger than that devoted to the corn for fodder and for silage purposes. It will be seen that of the three varieties used for the experiment throughout Ontario, in 1908, the King Philip gave the greatest yield, the average for this variety being 46.3 bushels per acre, as compared with 43.2 for the Compton's Early, and 38.8 for the Genesee Valley, according to the reports furnished from seventeen different localities. We have used the King Philip and the Compton's Early for the co-operative experiments in each of eight years, in the majority of which the King Philip took the lead in yield per acre. In the average of the eight years, however, the difference was not very marked, being about one-half bushel per acre per annum in favour of the King Philip variety. It will be seen from the results for this year that the Compton's Early was more popular with the experimenters than the King Philip. This is probably due to the fact that the ears of the Compton's Early are usually quite uniform, especially in their yellow color. The grain of the King Philip variety has a distinctly reddish cast when it is thoroughly ripened, but this is not the case with the immature grain; hence the King Philip is not always uniform in color, especially when the ears are freshly husked. The Genesee Valley is a very early, yellow flint corn which has been giving good results at the College and in some parts of Ontario. It is one of the best of the very early varieties of corn.

Mixtures for Grain Production. Within the past fifteen years, a large amount of work has been accomplished at the Agricultural College in determining the comparative results from growing grains in mixtures as against the growing of the same kinds of grains separately. A study has also been made of the various classes and varieties of grain, in order to ascertain which kinds can be mixed together for the best results for green fodder, hay, and grain production. For the details of these results, the reader is referred to the Annual Reports of the Ontario Agricultural College. For the production of grain, experiments show that when different classes of grain have been mixed together, they have yielded more heavily in nearly all cases than when grown separately. Of the various classes used, the highest yield has been obtained from oats and barley. Of the different varieties which have been included in this experiment, the mixture of Mandscheuri barley and Daubeney oats has been one of the most satisfactory up to the present time. We are at present endeavouring to originate a new variety of barley through hybridization, which will possess the good characteristics of the Mandscheuri barley, and at the same time will be about ten days later than that variety, and will thus mix nicely with the Siberian, Banner, or other variety of oats which are medium in date of maturity.

For four years in succession, we have used three different mixtures of grain in order to compare the results of these mixtures throughout the Province, and in order to give the farmers a better opportunity to study the results of the same. The mixtures have been the same in each of the four years. It is interesting to know that the combination of Mandscheuri barley and Daubeney oats has given the greatest yield of grain per acre in each of the four years. In 1908, this mixture gave 174 pounds more than the Siberian oats and Two-rowed Canadian barley, and 260 pounds more than the mixture of Siberian oats, Two-rowed Canadian barley and Wild Goose spring wheat. In each of the four years, the Mandscheuri barley and the Daubeney oats has been decidedly the most popular with the experimenters. It is only within the last year or two that the Bureau of Industries at Toronto has collected statistics regarding the area devoted to mixed crops in this Province. We notice that in 1908 no less than 456,049 acres were devoted to mixed grains. This area is almost as great as that for the cultivation of corn for fodder, silage and grain production.

Varieties of Potatoes.

According to the November report of the census and statistics office of the Department of Agriculture, at Ottawa, we learn that in 1908, the area devoted to potato growing in Ontario was greater than the combined area used for the growing of potatoes in Nova Scotia, New Brunswick, Prince Edward Island, Manitoba, Saskatchewan, and Alberta. We also learn that the estimated value of the potato crop grown in Ontario in 1908 was slightly over twelve million dollars. It will therefore be seen that the potato crop is an important one in this Province. If the farmers of Ontario would select a few of the very best varieties of potatoes and grow those varieties almost exclusively for their general crop, the products would be more uniform and better prices would be realized. In connection with the co-operative experiments in 1908, the various experimenters were asked to furnish the names of those varieties which were most extensively grown in their counties. As a result of this inquiry, we received four hundred and five replies, and no less than ninety varieties of potatoes were named, some experimenters mentioning two, three, or four varieties. Of the ninety varieties referred to, each of seventy-one of them was mentioned less than five times. Those which were mentioned for more than ten times are as follows:—Rural New Yorker, 57; Empire State, 42; White Elephant, 30; Beauty of Hebron, 30; The two Carmans, No. 1 and No. 3, taken together 28; American Wonder, 27; Early Rose, 24; and Early Ohio, 15. The seven varieties which were mentioned from five to nine times are as follows: Delaware, 9; Bovee, 8; Burbank's Seedling, 6; Green Mountain, 6; Irish Cobbler, 6; Six Weeks, 6; and Sir Walter Raleigh, 5. The Experimental Union has distributed five out of the nine varieties which are apparently now grown the most extensively throughout the Province. It is interesting to note that in response to the inquiry made as to the most extensively grown potatoes in 1907, exactly the same nine varieties as are here named were mentioned the greatest number of times, but the order of these nine varieties is slightly different. In each of the years, however, experimenters referred to the Rural New Yorker as the most extensively grown throughout the Province, and the Empire State as the second variety in this particular.

In the spring of 1908, the Experimental Union distributed two varieties of late potatoes, three varieties of medium potatoes, and seven varieties of early potatoes for experimental purposes. Only two varieties were sent

to each experimenter, but in each group of potatoes one variety was distributed throughout and used as the basis of comparison in summarizing the results. A very large number of applications were forwarded to us and no less than 468 valuable reports of successfully conducted experiments were received this autumn, besides a large number of others, many of which contained good information, but through some cause or other could not be used in the summary. The following table gives the average results of the co-operative experiments with varieties of potatoes conducted on four hundred and sixty-eight farms throughout Ontario in 1908.

POTATO EXPERIMENT.

Experiments.	Potatoes.	Comparative Value.	Per cent. of small tubers.	Mealiness when cooked.	Bushels of whole crop per acre.
Late Varieties..... (127 tests)	Dempsey's Seedling........	94	9	94	175.68
	Empire State	100	9	100	174.61
Medium Varieties. (98 tests)	Burpee's Extra Early.	100	10	100	155.36
	Rose of the North..........	90	13	98	143.03
	Green Mountain	97	9	94	135.92
Early Varieties.... (243 tests)	Early Puritan..............	100	12	99	132.95
	Extra Early Eureka........	86	14	100	130.60
	Early Fortune	80	14	96	121.71
	Early Dawn	71	15	92	113.86
	Early Andes...............	80	12	94	111.65
	Early Pinkeye.............	54	17	68	80.53
	Stray Beauty...............	42	24	75	55.48

It will be observed from the table that the results from the Dempsey's Seedling and the Empire State varieties are very similar. The Dempsey's Seedling has a slight advantage in yield per acre, and the Empire State was slightly more popular with the experimenters and produced potatoes a little better in mealiness than those produced by the Dempsey's Seedling variety. These two varieties were tested throughout Ontario in 1905 and again in 1906. In the average of those two years the Dempsey's Seedling was slightly higher than the Empire State in yield of tubers per acre. Both the Empire State and the Dempsey's Seedling have given very excellent results in the experiments at Guelph, and we have found that in comparing them with other late varieties throughout Ontario, that they take the lead in nearly all experiments. As the Empire State potatoes are white, they are probably rather more saleable in the markets of Ontario than those of the Dempsey's Seedling which have a slightly rose color.

Of the three varieties of medium ripening potatoes tested over Ontario during the past year, the Burpee's Extra Early again takes the lead. Not only has it produced a greater yield per acre, but it was also higher in popularity and produced potatoes which were better in mealiness than either of the other two varieties belonging to this class.

No less than two hundred and forty-three good reports of early potatoes were received in the autumn of the present year. Although the Early Puritan is not a new variety, it was distributed throughout Ontario in connection with our co-operative experiments in 1908 for the first time, and has made a very good record indeed, producing a high yield of potatoes of good quality. The Extra Early Eureka variety of early potatoes was used in connection

with the co-operative experiments in 1907 for the first time, in which year it took the lead in yield per acre. The potatoes are white in color, smooth and compact in form, and are of excellent quality. The Early Fortune, which is a flat, oval potato, of a rosy color, has been used in the co-operative experiments in each of five years. In 1904, it was second; 1905, first; 1906, second; 1907, third; and 1908, third on the list of the early varieties in yield of tubers. The Early Dawn gave a slight increase over the Early Andes in 1908, but in 1907 the Early Andes surpassed the Early Dawn in yield per acre to a small extent. The Early Pinkeye and the Stray Beauty gave the lowest yields per acre in 1908 as in 1907.

Taking the results of the co-operative experiments, both for this year and for other years into consideration, we find that those varieties which have made excellent records throughout Ontario in producing large yields of potatoes of good quality are the Empire State and the Dempsey's Seedling of the late varieties, the Burpee's Extra Early and the Rose of the North of the medium ripening varieties, and the Extra Early Eureka and the Early Fortune of the early varieties.

Sweet Corn for Home Use.

Upwards of fifty varieties of sweet corn have been tested at the Agricultural College for productiveness and for table quality. There is a great variation in the different varieties in stage of maturity, in the size and the color of the ears, in the flavor and the juiciness of the grain, etc. Sweet corn for table use is greatly relished by many people throughout Ontario. In order to encourage this use and to allow the farmers to secure some of the very best varieties, and to ascertain for themselves which kinds would prove most suitable for cultivation for home use, a few of the choice varieties have been selected for co-operative experimental work. In the spring of 1908, three varieties were distributed for testing throughout Ontario. The following table presents the average results of the experiment of the three varieties of Sweet corn tested for home use on thirty-three Ontario farms:—

Experiment.	Varieties.	Comparative value.	Number of ears.	Number of days until ready for table use.	Table Quality.	
					Flavor.	Juiciness.
Sweet Corn (33 tests)	Golden Bantam........	100	152	86	100	100
	Mammoth White Cory.	97	158	82	76	77
	Malakhoff..............	57	152	84	66	74

The Malakhoff variety of sweet corn was introduced from Russia into the United States through the Department of Agriculture at Washington, and has been tested at a number of the Experimental Stations. It has been grown at the Ontario Agricultural College in each of the past five years, and was distributed for co-operative experimental work throughout Ontario in 1908 for the first time. The Mammoth White Cory sweet corn has been grown in Ontario for a number of years, and is one of the best known varieties in the Province. Of all the varieties of sweet corn which have been tested at the Ontario Agricultural College, the Golden Bantam is the favorite

variety for the table. The ears are rather small, yellow in color, and possess eight rows. The corn is exceedingly tender and possesses an excellent flavor. In the co-operative experiments over Ontario for 1907, the Golden Bantam was reported by the experimenters as possessing the best table quality and as being the choice of the varieties tested for home use. It will be seen from the foregoing table that it has also made an excellent record in 1908, occupying the highest place in both flavor and juiciness, and also in the comparative value, when all points are taken into consideration.

Field Roots, Fodder Plants, and Hay Crops.

Under this heading, experiments were conducted during the past year with mangels, sugar beets for feeding purposes, swede turnips, fall turnips, carrots, corn for fodder and for silage, millet, sorghum, grass peas, vetches, rape, kale, field cabbage, clover, Lucerne, Sainfoin, Burnet and grasses. The average results of the carefully conducted experiments with the most of these crops are presented in tabulated form, but it seems a difficult matter to get returns from grasses and clovers which can be tabulated, so as to be clearly understood. The following table is very interesting and furnishes a good opportunity of comparing the results of the various varieties as grown during a season such as we have had in 1908:—

Field Roots and Fodder Crops.

Experiments.	Varieties.	Comparative value.	Yield per acre (tons).
Mangels (7 tests)	Sutton's Mammoth Long Red	100	31.60
	Ferry's Yellow Leviathan	100	29.73
	Carter's Windsor Yellow Globe	97	28.58
Sugar Beets (7 tests)	Rennie's Tankard Cream	100	32.72
	Bruce's Giant White Feeding	81	31.57
Swede Turnips (3 tests)	Sutton's Magnum Bonum	70	24.16
	Carter's Invicta	100	22.15
	Steele-Brigg's Good Luck	73	18.59
Carrots (3 tests)	Bruce's Mammoth Intermediate White	100	14.87
	Steele's Improved Short White	92	14.39
Fodder Corn (4 tests)	Henderson's Eureka	100	15.63
	White Cap Yellow Dent	82	14.83
	Reid's Yellow Dent	73	14.33
Sorghum (3 tests)	Early Minnesota Sugar Cane	100	9.92
	Early Amber Sugar Cane	92	9.24
	White Kaffir Corn	46	4.87
Grass, Peas and Vetches (1 test)	Hairy Vetches	100	12.24
	Grass Peas	93	9.60
	Common Vetches	71	8.40
Rape, Kale and Cabbage (2 tests)	Sutton's Earliest Drumhead Cabbage	100	17.06
	Thousand Headed Kale	94	16.79
	Dwarf Essex Rape	88	16.47
			Hay.
Millet (6 tests)	Japanese Panicle	100	5.19
	Golden Wonder	87	4.93
	Hungarian	93	4.71

Mangels. The three varieties of mangels used in the co-operative experiments in 1908 represent three distinct types, viz., the long, the intermediate, and the globe. At the present time the intermediate mangels are grown much more extensively throughout Ontario than formerly. There are a large number of varieties of each of the three classes here mentioned, and according to our results at Guelph we find a considerable difference in the productiveness of the different varieties of each class. During the past two years we have obtained very excellent results from the Yellow Leviathan, which belongs to the yellow intermediate class. Previous to 1908, it gave the greatest yield of roots per acre of the different varieties used in the co-operative experiments throughout Ontario in each of four years. It will be observed that in 1908 it was surpassed by the Sutton's Mammoth Long Red by an average of nearly two tons per acre. Previous to 1908, the Yellow Leviathan was the most popular variety distributed in each of four years.

Sugar Beets. The Giant White Feeding variety of sugar beets was compared with the Royal Giant in 1905 and again in 1906, and with the Tankard Cream in 1907 and in 1908. In each of the past three years the Giant White Feeding has given the greatest yield of roots per acre in the co-operative experiments throughout Ontario. In 1908, however, this variety was surpassed by the Tankard Cream both in yield and popularity. According to the chemical analyses at the College, the Giant White Feeding has given an average of 7.8 per cent. sugar in the average of six years, and the Tankard Cream 8.9 per cent. sugar in the average results for five years. The Tankard Cream variety has certainly made a good record in the co-operative experiments for 1908.

Swede Turnips. Owing to the dry, warm autumn, the growth of swede turnips was comparatively light, and the ravages of the plant lice were unusually great this year. We have the reports of only three successfully conducted experiments with swede turnips for the past season. The Sutton's Magnum Bonum has been included as one of the varieties in the co-operative experiments in each of the past five years, and has produced the greatest yield per acre of the three varieties distributed in each of these years with the exception of 1907, at which time it was surpassed by the Carter's Invicta by an average of three-quarters of a ton of roots per acre. The Carter's Invicta seems specially suitable for the production of roots for shipping to the American markets for table use. It has been selected as one of the choice varieties for this purpose amongst all the varieties tested at the College. It will be observed that, although the Sutton's Magnum Bonum gave a larger yield than the Carter's Invicta in the average results for 1908, the latter named variety was the most popular with the experimenters.

Fall Turnips. Owing to the continued dry warm weather over a considerable amount of Ontario during the past autumn, the experiments with varieties of fall turnips proved to be of but little value, and no results of this experiment are presented in the tabulated statement.

Carrots. It will be observed that Bruce's Mammoth Intermediate Smooth White Carrot again made a good record in the co-operative experiments in 1908. It was, however, followed very closely indeed by the Steele's Improved Short White. Both of these are excellent varieties of carrots which have made good records at the College as well as throughout Ontario.

Fodder Corn. The Henderson's Eureka variety of corn has been a very heavy yielder of fodder in the experiments at the College. It is one of the very best of the large late varieties of fodder corn which has been under experiment. The White Cap Yellow Dent and the Reid's Yellow Dent are both somewhat earlier than the Eureka, but produce lighter yields per acre.

In comparing Henderson's Eureka and the White Cap Yellow Dent over Ontario for four years in succession, it is found that 17.8 tons represents the average yield of green crop per acre of the former and 14.5 tons of the latter. Usually, the White Cap Yellow Dent is a very popular variety throughout Ontario. Owing to the exceptionally warm and late autumn of 1908, however, the Henderson's Eureka had more than a usual opportunity for development. It is a variety which is more particularly suitable for the warm, sharp soils bordering on the lakes of the southern part of Ontario. In the greater part of the corn growing districts of this Province, the White Cap Yellow Dent has been giving very good satisfaction indeed.

Sorghum. A considerable number of sorghums, including different varieties of sugar cane, broom corn, kaffir corn, milo maize, Jerusalem corn, etc., have been grown at the College for several years in succession. Some of these, and especially the sugar canes, have given good results. In some localities throughout Ontario, sugar cane has been grown with a considerable amount of satisfaction as a fodder crop. The results of the co-operative experiments over Ontario in 1908 are rather lower than usual, as the highest average yield was only 9.9 tons per acre, while that of the highest yielding fodder corn was 15.6. There is usually not as great a variation in the production of the two crops as is here indicated. In the average of five years' testing of the Early Amber Sugar Cane and the Kaffir Corn throughout Ontario, the former has produced 14.3 and the latter 9.6 tons of green crop per acre. The sugar cane is greatly relished by animals, and its cultivation is practised in some localities.

Grass Peas and Vetches. The Hairy Vetches which gave 12.2 tons of green crop per acre in 1908, produced 9.2 tons in 1907, 7.9 tons in 1906, 8.9 tons in 1905, and 5 tons in 1904. The Hairy Vetches, Common Vetches and Grass Peas have been tested over Ontario for a number of years under uniform conditions. The average results show that the Hairy Vetches gave the greatest and the Common Vetches the lowest yield of green crop per acre. Much has been said regarding the growing of Hairy Vetches in the United States and in Canada, but owing to the fact that the seed usually costs fully $5.00 per bushel, and that it requires from one to one and a half bushels of seed to sow an acre, it is doubtful if this will become extensively grown as a fodder crop in Ontario, unless seed can be obtained at a less cost per bushel. Grass Peas make a very good fodder crop and can sometimes be used for this purpose to advantage.

Autumn Sown Hairy Vetches and Winter Rye. In each of five years the seed of Hairy Vetches and of Winter Rye was distributed throughout Ontario for co-operative experiments in testing these crops for fodder purposes. In the average of the five years' experiments, the Hairy Vetches produced slightly the largest yield of green fodder per acre, but in 1908 the largest yield was produced by the Winter Rye.

Rape, Kale, and Cow Cabbage. In each of the past five years, twenty-five varieties of rape, kale, field cabbage, Brussels sprouts, etc., have been grown in the Experimental Department at the College. In these results the Sutton's Earliest Drumhead cabbage has given the highest average yield of green crop per acre, when the seed was sown and treated in exactly the same way as that of rape. In a similar experiment, the Thousand Headed kale has given the second highest yield of green fodder per acre. In the spring of the present year, the Sutton's Earliest Drumhead cabbage was incorporated in the work of the Experimental Union for the first time. The demand for the seed of the cabbage, kale and rape was very limited in the spring of the present year, but the results of the two good reports of success-

fully conducted experiments show that the field cabbage gave a yield of one-half ton more of green crop per acre, and was rather more popular with the experimenters than the Dwarf Essex rape.

Millet. Six co-operative experimenters reported on the hay production of each of three varieties of millet used for these experiments during the present year. It will be seen that the Japanese Panicle has again made an excellent record, both in the production of hay and in the estimation of those who conducted the test, in comparing this variety with the Golden Wonder millet and with the Hungarian Grass. The Japanese Panicle and the Hungarian Grass have been tested in connection with the Experimental Union work for the last ten years, and it is found that the former has surpassed the latter in yield of green crop pr acre by twenty-five per cent.

Clovers. The Common Red, Alsike, and Mammoth Red varieties of clover are distributed for co-operative experiments each year. As the Common Red usually produces two crops in the one year, and each of the others one crop per season, and as the Common Red is not apt to survive the second winter as well as the Mammoth Red, it is difficult to get accurate results which will form a good summary report. The experiments with these crops, so far, have been chiefly valuable to the individuals conducting them.

Alfalfa, Sainfoin, and Burnet. Another experiment from which it is exceeding difficult to get data which can be placed in tabulated form is the one with the three perennial crops, Alfalfa, Sainfoin, and Burnet. As these produce a varying number of crops per year, and as the crops of the different varieties are ready for cutting at different dates, it is very difficult for the various co-operative experimenters to secure thoroughly reliable yields of these crops under similar conditions of maturity, moisture, etc. Our past experiments show that of these three crops, the Alfalfa, or Lucerne, is decidedly the most popular for hay production. In growing Alfalfa at the College in each of 11 years, from 1896 to 1908, the average yield of green crop per acre has been 21.5 tons, and the yield of cured hay per acre has been 5.2 tons. There has been an average of three cuttings per annum or of thirty-three cuttings during the eleven years. Our co-operative work shows that Alfalfa can be grown successfully on many of the farms of Ontario where the land is suitable, but it should always be remembered that Alfalfa requires land with a subsoil which is well underdrained, either naturally or artificially. The experiments at the College have shown that Turkestan Alfalfa seed, which has been imported, has given high results, but that the seed obtained through the American trade, under the name of Turkestan Alfalfa, has given poor satisfaction. The Experimental Union was fortunate in securing through the Department of Agriculture of the United States, a quantity of Tukestan Alfalfa. In the spring of the present year this was distributed to the experimenters along with the Common Alfalfa seed for co-operative experimental work. The experimenters were asked to state in their reports which of these two strains of Alfalfa gave the best appearance about the middle of October of the present year, and practically all of the farmers have reported that the Turkestan Alfalfa was better in appearance than the Common variety when examined in the autumn. The results of these experiments will be watched with interest in the future.

Grasses. The varieties which have been distributed during the last few years are as follows:—Tall Oat, Timothy, Orchard Grass, Awnless Brome, Tall Fescue, Western Rye and Lyme Grass. The Tall Oat grass not only gave the largest yield of hay per acre in 1908, but also gave the greatest yield of hay per acre in the average results of all the reports received within the last four years. It is unfortunate that the seed of the Tall Oat grass

is expensive. There are many excellent object lessons and much valuable information obtained from the co-operative experiments with the different varieties of grasses in studying their adaptability to the different soils and their comparative usefulness for pasture as well as for hay production.

Fertilizers with Farm Crops.

The fertilizer experiments are among the most difficult to conduct in field plots, either at an experiment station or throughout the country. Soils vary greatly in their composition, crops vary largely in the amount of plant food required and in their power of making use of the same from the soil, and fertilizers themselves vary, to a marked degree, in both the amount and the availibility of plant food which they contain. At some experiment stations, such as that established by Sir. J. B. Lawes and Sir Henry Gilbert at Rothamsted, England, the Royal Agricultural Society at Woburn, England, and the State Experiment Station at Wooster, Ohio, elaborate and long continued fertilizer experiments have been conducted at a great expense, the results of which are valuable in furnishing certain information. While it is true that valuable experimental work can be conducted with fertilizers at an experiment station, it is also true that many of the results cannot be used as a direct and sure guide for the farmer on his own particular farm. If, however, elaborate experiments with fertilizers are planned for the farmers to conduct, they will find the work and the expense to be beyond their reach. Realizing this fact, some comparatively simple experiments were arranged in connection with the Experimental Union, sixteen years ago. While it is true that these experiments have not accomplished all that we would like to have fertilizer experiments accomplish, the same can be said regarding every fertilizer experiment in field plots which has ever been conducted in any part of the world. The table gives a summary of all the experiments conducted through the medium of the Experimental Union within the past sixteen years, including the tests of fertilizers with winter wheat in 1908 for the fifth year, and those with potatoes for the second year.

Kind of fertilizer used.	Fertilizer per acre.		Oats.	Winter wheat.	Fodder corn.		Mangels	Swede turnips.	Potatoes
					Total.	Ears.			
	Weight.	Cost.	5 years 74 tests.	5 years 15 tests.	8 years 47 tests.	8 years 41 tests.	5 years 41 tests.	3 years 11 tests.	2 years 38 tests.
	lbs.	$ c.	bus.	bus.	tons.	tons.	tons.	tons.	bus.
Nothing.....	....	....	38.9	19.9	8.2	2.7	20.6	21.2	134.4
Nitrate of Soda	160	4 80	46.3	23.8	9.4	3.1	26.5	25.2	163.1
Muriate of Potash.....	160	4 00	43.8	22.9	9.4	3.0	24.6	25.6	170.2
Superphosphate......	320	3 92	43.6	22.7	9.0	3.1	24.2	26.6	168.9
Complete Fertilizer.....	213	4 24	48.7	25.2	9.4	3.2	25.4	28.5	180.9
Potato Fertilizer.....	320	5 52	....	....	....	....	....	....	176.5
Royal Canadian.......	320	5 60	....	....	....	....	....	....	173.0
Cow Manure.	40,000	6 00	....	27.1	....	....	....	30.3	187.1

In each of the years, both the fertilizers and the seeds have been sent from the College to the experimenters. In every instance, the nitrate of soda and the muriate of potash have been applied at the rate of 160 pounds per acre, and the superphosphate at the rate of 320 pounds per acre. The mixture of complete fertilizer has been composed of one-third the amount of these fertilizers, making in all 213 1-3 pounds. Both the Royal Canadian and the potato fertilizer used in 1908 with the potato crop, were applied at the rate of 320 pounds each per acre. In all cases, the nitrate of soda has been applied when the plants were about three inches in height, and all the other fertilizers at the time of sowing the seed. Farmyard manure has been used in the experiments of the past seven years. The advice of each experimenter has been to apply 500 pounds of average cow manure per plot, the application being equal to twenty tons per acre. The cow manure has been mixed with the soil to a depth of from four to five inches, and the fertilizers have been stirred in the soil to a depth of from one to two inches.

In connection with the co-operative work, experiments have been conducted throughout Ontario with fertilizers on oats for five years, winter wheat for five years, fodder corn for eight years, mangels for five years, swede turnips for three years, and potatoes for two years. The reports for 1908 are confined to the experiments with fertilizers with winter wheat, and with potatoes.

The cost of each fertilizer, as given in the table, represents very closely the present cost per acre for the fertilizers as used in the co-operative experiments. The quotations were based on the factory prices for quantities of one ton in each case. The twenty tons of cow manure would mean about twelve good sized loads per acre, and manure in Guelph has been selling at 50 cents per load, which is probably about the average for the province. It is exceedingly difficult to place a price on farmyard manure, as in most cases it is not purchased but is produced on the farm. Each person may place such value on the manure as he deems expedient, and study the results according to his own circumstances. It should be remembered that the freight on the fertilizers and the application of both the fertilizers and the manure are not taken into consideration in the foregoing statement, nor yet is there any account made of the future influence of the different fertilizers and the manure upon the land.

Fertilizers with Oats. Seventy-four good reports of successfully conducted experiments in applying fertilizers to oats were received during the five years in which this experiment was conducted over Ontario. The lowest average yield was obtained from the unfertilized land, 38.9 bushels per acre; and the highest average yields from the mixed fertilizer, 48.7 bushels; and the nitrate of soda, 46.3 bushels per acre. The unfertilized land produced the lowest yield per acre in each of the five years. The mixed or complete fertilizer gave the largest yield of oats per acre in the average results of this experiment in each of the five years in which it was conducted. Although the land which received the mixed fertilizer gave an average of 9.8 bushels of oats per acre more than the unfertilized land, still this increase was produced at a cost of about 42 cents per bushel, according to the present prices of fertilizers. It will therefore be seen that it is only in special years that the commercial fertilizers will give economical results with oats on the average land of Ontario. The mixed fertilizer gave a larger average yield than no fertilizer on heavy soils by 12.7 bushels per acre, on light soil by 10.2 bushels per acre, and on black mucky soils by 7.1 bushels per acre.

Fertilizers with Winter Wheat. In the co-operative experiments with different fertilizers applied to winter wheat, it will be seen that the greatest average yield per acre was produced from the application of cow manure. The complete fertilizer, however, when applied at the rate of only 213 pounds per acre, gave less than two bushels per acre below the cow manure. It will be observed that the land which received the complete fertilizer gave 5.3 bushels per acre more than that which received no fertilizer. In 1908, the results were in exactly the same order as those given for the average of five years, with the exception that the nitrate of soda gave about one-quarter bushel per acre less than the muriate of potash in the average of the six experiments. According to the prices of fertilizers given in the table, the most economical increase in yield of winter wheat was made by the application of the mixed fertilizer, and even in this case the cost of the increased yield amounted to 82 cents per bushel.

Fertilizers with Corn. In the average of experiments in applying fertilizers with corn in each of eight years, during which time forty-seven complete and satisfactory reports were received, it will be seen that the yields of whole crop produced by the plots which received an application of nitrate of soda, muriate of potash, and mixed fertilizer, were equal, while a plot on which superphosphate was applied produced nearly half a ton less than the others, and that the largest yield of husked ears was obtained when the mixed fertilizer was applied to the land. The muriate of potash produced the corn at the least cost per ton, but even with this fertilizer it cost $3.33 on the average to produce each additional ton of fodder corn.

Fertilizers with Mangels. During the five years in which fertilizers were used with mangels, forty-one good reports of successfully conducted experiments were received. These show that the smallest average yield was produced from the unfertilized plot; viz., 20.6 tons per acre, and that the largest average yield was produced from the nitrate of soda; viz., 26.5 tons per acre. As in the case with corn, the unfertilized land gave the lowest yield in each year. The nitrate of soda produced the highest yield in four out of five years. The average of 197 bushels of mangels per acre, produced by the nitrate of soda over the unfertilized land, was obtained at a cost of about 2.4 cents per bushel. The nitrate of soda produced the largest yield on both heavy and light soils, but on the black loams the muriate of potash gave the highest yield of mangels. The nitrate of soda showed the greatest influence upon the light soils, as in the average of fifteen experiments the sandy land which was fertilized at the rate of 160 pounds of nitrate of soda per acre gave an average yield of 7 2-3 tons per acre more than the land which was unfertilized.

Fertilizers with Swede Turnips. On averaging the results given in all the reports of the test of fertilizers with swede turnips, we find that barnyard manure has been instrumental in producing the largest yield of roots, and that mixed fertilizer stands second in this respect. According to the prices given for the manure and the fertilizers in the foregoing table, the increased yield of turnips was produced at a cost of 66 cents per ton by the use of cow manure, and 82 cents per ton or 2.5 cents per bushel by the use of the mixed fertilizer.

Fertilizers with Potatoes. Thirteen different kinds of fertilizers were used with potatoes at the Ontario Agricultural College for five years in succession. In this experiment, the Royal Canadian fertilizer gave the highest, and the Potato fertilizer the second highest yield of tubers per acre. Another experiment was afterwards arranged and was also conducted

for five years in succession, and it was found that the highest average yield of potatoes was obtained from the use of a mixed fertilizer similar to the one used in connection with our co-operative work with other crops. This, however, was closely followed in yield by the Royal Canadian and by the Potato fertilizer. The last two are both complete fertilizers, each containing nitrogen, phosphoric acid and potash. The Royal Canadian fertilizer is sold by the Capelton Chemical Co., Buckingham, Que., and the Potato fertilizer by The W. A. Freeman Co., Hamilton, Ont. In the spring of 1907, and again in 1908, both potatoes and fertilizers were distributed from the College throughout Ontario. From these experiments, twenty-two good reports of successfully conducted tests were received in 1907 and sixteen in 1908. The average results of the two years' tests are presented in the foregoing tabular form. The results for the two years were very similar, running in exactly the same order throughout with the exception that the muriate of potash and the superphosphate changed places in the results of the two years, but the difference in yield was quite small in both cases. It will be seen that of the commercial fertilizers, the three complete manures gave the highest results, and of these, the mixture composed of 53 pounds of nitrate of soda, 53 pounds of muriate of potash, and 107 pounds of superphosphate gave a higher yield per acre than either the Potato fertilizer or the Royal Canadian. The highest yield of all was produced by an application of cow manure at the rate of 20 tons per acre. The land thus treated gave an average of 52.7 bushels per acre more than the land which received no application whatever.

According to the prices given in the table, the cost of the increase in bushels of potatoes per acre in the average of the two years' experiments was in each case as follows: Mixed fertilizer, 9.1 cts.; muriate of potash, 11.2 cts.; superphosphate and cow manure, 11.4 cts.; Potato fertilizer, 13.1 cts.; Royal Canadian fertilizer, 14 cts.; and nitrate of soda, 16.7 cts. In each of the past two years, the majority of the experimenters tested the potatoes grown from all the fertilizers and reported the results for both flavor and mealiness. It was found that the table quality was influenced but very slightly indeed by the fertilizers, there being only a variation of five or six per cent. in the average results in reference to the table quality. The highest average results from the use of fertilizers on nine sandy soils in 1907 were obtained by the Potato fertilizer, cow manure, and muriate of potash, and on ten experiments in 1908, by the Potato fertilizer, cow manure, and mixed fertilizer. On the clay loam and heavy clay soils, however, the highest average yield was produced by the cow manure and the Royal Canadian fertilizer in 1907, and by the cow manure, Potato fertilizer, mixed fertilizer and Royal Canadian in 1908. Much interest was shown in this experiment throughout.

Q.—How does the Hulless barley compare with Mandscheuri barley in feeding value?

PROF. ZAVITZ: I think the Hulless barley is slightly richer for feeding purposes than the Mandscheuri variety. We have in the Hulless barley a grain without a hull, as the name implies, while in the six-rowed varieties we have a grain with a hull of about 15 per cent., and of course the hull is not as valuable for feeding purposes as the rest of the grain.

Q.—Is the Hungarian wheat a bearded variety?

A.—Yes.

Q.—Do you test the Wild Goose wheat with the other varieties?

A.—Yes, the object being to compare the productiveness of the different wheats under uniform conditions.

Q.—Would you advise placing the Wild Goose wheat in the same class as other wheats for exhibition purposes?

A.—No, I do not think it would be fair. The Wild Goose spring wheat is a durum or macaroni variety. It has a large grain which is very hard. It would be very difficult, indeed, for a judge to know how best to place the awards if the Wild Goose is entered in the same class as other varieties of spring wheat, such as the Red Fife, Colorado, etc.

Q.—I have seen judges at a loss to know how to place the awards at some of the fall fairs when the Goose wheat has been entered in the same class as the others.

A.—I can very well understand that it would be a very difficult thing to know how to judge all of these wheats in the same class. The Wild Goose variety is particularly suitable for the manufacture of macaroni, and is frequently shipped out of our Province to foreign countries for the manufacture of macaroni. In some years we have been able to get a higher price for the Wild Goose than we have for our varieties of wheat for flour production. During the past few years, however, the price of the Wild Goose variety has been slightly lower than that of the finer wheats. The Wild Goose variety is more difficult to grind than other kinds of spring wheat grown in Ontario. It is a spring wheat of high gluten content, however, and the millers are now using it considerably for the production of flour to mix with that obtained from winter wheat, in order to improve the quality of the latter.

Mr. Carleton: Do you know whether Rye buckwheat is used for buckwheat flour?

A.—I think it is used for flour production in Nova Scotia. We are not as yet growing this variety as a general farm crop in Ontario. The Rye buckwheat is grown much more extensively in Nova Scotia than all other varieties combined.

Mr. Hubbard: It makes a yellow flour and it shells easily and ripens unevenly.

Prof. Zavitz: I have noticed that it ripens a little more unevenly than any of the other varieties. We have grown it at the College in each of the past five years, and in that period of time it has given an average yield per acre of 32.7 bushels, in comparison with 23.5 as the average annual yield per acre of the Silver Hull variety, under similar conditions. We intend to study this variety more carefully.

Q.—How do you tell Emmer from Spelt?

A.—Emmer possesses compact bearded heads, while the Spelt has a long open head and is nearly always beardless. The Emmer is exceptionally free from rust, while the Spelt usually rusts very badly. The Emmer produces a large yield of grain, while the Spelt gives very poor results in Ontario.

Q.—Is there any difference in the grain?

A.—After the crop is threshed, the most of the grain is still surrounded by the chaff, owing to the fact that the heads simply break up into their separate spikelets. If these spikelets are examined, it will be observed that they are very pointed at the base, in the case of the Emmer, and that they are broad and blunt in the case of the Spelt. This is always a distinguishing feature between the two kinds of grain.

Q.—Do you know anything of the Scotch Blue pea?

A.—We have grown both the Prussian Blue and the striped blue varieties, but have not tested a pea under the name of the Scotch Blue. I think likely they are a garden variety, and in the Department of Field Husbandry we deal more particularly with those varieties most suitable for growing as

A MEMBER: I sold a car load in Buffalo a short time ago. I think they must use them for soup. They went under the name of the Scotch Blue pea.

PROF. ZAVITZ: It is possible the Scotch Blue peas have been tested in the Horticultural Department here at the College. The yield of field peas throughout Ontario has been particularly good during each of the past two years. We hope the pea weevils have been reduced to such an extent that our farmers can grow peas once more with the same satisfaction as in former years.

Q.—Do you get as good results from oats and barley as you do from barley alone?

A.—We have obtained about two hundred pounds more grain per acre from oats and barley in combination than from either one grown separately, in the average results of duplicate experiments conducted in each of six years.

MR. W. L. SMITH: Would there not be a great deal of waste when peeling the Dempsey's Seedling variety of potatoes?

PROF. ZAVITZ: The waste would probably be a little more in the case of the Dempsey's Seedling than in that of the Empire State variety, which is a comparatively smooth potato.

PROF. MCCREADY: Have you sent out the Rural New Yorker No. 2 variety of potatoes for experimental purposes?

PROF. ZAVITZ: Yes, it is one of the varieties we have distributed for experimental purposes in former years. It has given excellent results in some localities, but not so good as the Empire State in other sections. From extensive inquiries made quite recently, I find that the Rural New Yorker No. 2 is the most extensively grown potato in Ontario at the present time, and that the Empire State stands second in general cultivation. Of the late varieties, I would emphasize the value of the Empire State and the Rural New Yorker No. 2 for cultivation in Ontario; of the medium early varieties, the Burpee's Extra Early and the Rose of the North; and of the early varieties, the Extra Early Eureka, Early Fortune, and Early Puritan varieties. Taking into consideration the results of the co-operative experiments of the last two years, the Early Eureka is coming to the front as a leading variety of the early potatoes. In mealiness it stands at the top of the list of the early kinds.

PROF. DEAN: I used to grow late potatoes in my garden, but lately I do not grow them at all because of the rot. Do you think it best to run the risk of rot?

PROF. ZAVITZ: In some seasons the late potatoes rot more than the early varieties, in others there is but little difference in the amount of rot from the two classes. In 1906, for instance, the percentage of rot from the early potatoes was fully as much as that from the late varieties, but in 1905 and in 1904, the late potatoes had a somewhat large percentage of rot than the early varieties. We must remember, however, that late potatoes nearly always yield considerably higher than the early varieties.

Q.—Would these potatoes all be through growing when they were dug?

A.—Yes, I would think that in all cases the potatoes would be matured when dug in the autumn of the present year.

Q.—As the Golden Bantam variety of sweet corn has rather a small ear, would you recommend its use?

A.—I certainly recommend the Golden Bantam sweet corn for home use very highly indeed. The corn is exceedingly tender and juicy, and possesses an excellent flavour. The size of the ears is very suitable for table use. We have tested about fifty varieties of sweet corn, not only in the field, but also for table use. The Golden Bantam has made a very high record as a

PRES. CREELMAN: We have been trying corn on our tables for years, and we have never come across anything that at all compares with the quality of the Golden Bantam variety. There is as much difference between that corn and the ordinary corn which you get on the market, as there is between the Snow apple and the Ben Davis apple in quality. Last year when this corn was at its best, we entertained the Scotch Commission of thirty-two members at our table, and while the Old Country people are not accustomed to eating corn on the ear, it was very fortunate that Mrs. Creelman took the precaution to prepare a large quantity, because they were particularly fond of it. I would like to hear Prof. Hutt say something regarding the Golden Bantam corn.

PROF. HUTT: We have been growing the Golden Bantam corn for several years as a garden variety. We used to grow half a dozen varieties, but we now grow this variety almost entirely, by planting at different dates so that we can keep up the supply.

Q.—Do you ever grow Stowell's Evergreen variety?

PROF. ZAVITZ: We have grown Stowell's Evergreen variety of sweet corn in our experimental grounds for many years. It produces large ears and is used largely for use in canning factories. It has not the sweetness or the juiciness of the Golden Bantam, and is not so suitable for home use. I first obtained a few seeds of the Golden Bantam variety in an envelope some eight or ten years ago.

Q.—Have you any report as to growing it in Manitoba?

A.—I do not recall any experiments which have been conducted with the Golden Bantam corn in Manitoba. The summary results which we here present are confined entirely to the experiments which have been conducted in Ontario.

Q.—Were your experiments with turnips confined to this district?

A.—We had but few reports from the experiment in growing turnips in 1908. Those which are used in the summary were from Renfrew, Muskoka and Algoma, so you see that the experiments were pretty well distributed. The Carter's Invicta is a variety of turnips of excellent quality and is very suitable for shipping to the eastern cities for table use.

Q.—How do the returns of co-operative experiments compare with those obtained at the College?

A.—I have been greatly pleased in past years with the results of co-operative experiments throughout Ontario. They conform quite closely with those conducted at the College, although there are sometimes slight exceptions. The experimental work at the College forms the basis of the co-operative work throughout Ontario, and each line of work would be deficient without the help of the other. The co-operative experiments enable both the farmers and the workers at the College to ascertain which of the leading varieties in the extensive experimental work at Guelph would give the most satisfactory returns on the various soils throughout the Province. We find that in almost every case those varieties which give high results at the College make excellent records throughout Ontario.

Q.—Why do you select such large varieties as Henderson's Eureka and Reid's Yellow Dent corn?

A.—These varieties of corn are tested for the production of fodder for the silo, and the Henderson's Eureka variety has proven to be the best of the large late varieties, but of course, is only suitable for the warm, sharp soils of the southern part of Ontario, and more particularly along the lakes. The Reid's Yellow Dent is a most valuable variety in the United States. It also requires comparatively warm, early soils in Ontario.

PROF. GRISDALE: We cannot ripen Reid's Yellow Dent once in ten years at Ottawa.

PROF. ZAVITZ: There are not many varieties of very early dent corn which give satisfactory results. The Sterling White Dent, however, is a promising early variety. The White Cap Yellow Dent is one of the very best varieties of fodder corn for the older parts of Ontario. It produces a good yield of total crop per acre, is of good quality, and is comparatively early as a dent corn.

Q.—What is the appearance of the Japanese Panicle millet?

A.—The Japanese Panicle millet has an upright growth, a large development of leaf, and a spreading head. The plants grow tall and stand up well. The seed is of a dark shiny appearance. Some of our seedsmen in their catalogues give cuts of the Japanese Panicle millet and describe the Japanese Barnyard grass. They seem to have the millets very badly mixed. I have known in a number of instances of farmers ordering Japanese millet and getting the Barnyard grass instead of the Panicle variety. In ordering the Japanese Panicle variety of millet, it is a good plan to first obtain a sample, which can then be examined to see whether the sample consists of the dark, smooth, shiny seed, and is of good quality and free from weed seeds. The larger quantity could then be ordered according to the sample.

Q.—Is there not sometimes trouble also in obtaining the wrong kind of rape seed?

A.—When ordering rape seed, the variety should always be mentioned. The Dwarf Essex rape is the one which is commonly used throughout Ontario. It is biennial, furnishing leaf and stalk the first year and producing no seed until the second season after it is sown; thus an excellent pasture is furnished in the first season. If rape seed is ordered without mentioning the variety, there is a danger of obtaining the Bird Seed or the German rape, which produces flowers and seeds in the same year in which it is sown. This variety furnishes very poor pasture and is troublesome as a weed. There have been several law suits in Ontario over this very matter. It is certainly advisable to always mention the special name of the distinct variety required when ordering seed.

Q.—Does the summer rape look like common mustard?

A.—The flower resembles that of mustard, but the leaves are quite different and the two plants are easily identified.

Q.—Is the Drumhead cabbage used in the same way as rape?

A.—The Sutton's Earliest Drumhead cabbage, which stands at the head of the list in over thirty varieties of rapes, kales, and cabbages grown at the College, and also in the co-operative experiments throughout Ontario in each of the past two years, is sown and cultivated in exactly the same way as rape, with the object of furnishing a green crop for feeding. Rape is usually fed either by pasturing or by cutting and feeding in the green condition.

Q.—What does the seed of the Drumhead cabbage cost per pound?

A.—It is more expensive than rape, but I am unable to give the exact price without looking the matter up.

PROF. DEAN: I notice that in the average of your sugar beets for 1908, the crop is slightly heavier per acre than mangels. Is that usual?

PROF. ZAVITZ: In most years, the heaviest yielding varieties of mangels will yield rather more than the heaviest yielding varieties of sugar beets. In the average of experiments at the College for the past five years, the highest yielding mangel gave practically 35 tons, and the highest yielding variety of sugar beets for feeding purposes, practically 31 tons of roots per acre.

Q.—Have you had any difficulty in getting pure seed of millet?

A.—We have had some difficulty in buying pure millet seed in Ontario. This seems particularly true in reference to the Hungarian grass. It is more difficult to get pure seed of Hungarian grass than pure seed of the Japanese Panicle variety of millet. It is always wise to first obtain a sample of the millet seed and examine it before ordering a larger quantity.

Q.—What is the idea of using such a small quantity of the complete fertilizer with potatoes? Is that quantity sufficient?

A.—It has been our aim to keep the price of the different fertilizes at about the same amount per acre. When using the complete fertilizer, if we apply as large a quantity of each ingredient as we did when using the ingredients separately, the cost for the complete fertilizer would be about $13.00 per acre, while that for each separate fertilizer would be about $4 or $5 per acre. It would thus be more difficult to compare the results. We expect to do a considerable amount of work in using different quantities of fertilizers with the potato crop here at the College, and the results of these experiments would form a basis for further co-operative experiments with potatoes throughout Ontario.

Prof. HARCOURT: The yields of potatoes are somewhat small as compared with what we would find in the Old Countries, and probably the use of larger quantities of fertilizers would furnish higher yields. I found this summer in Scotland that it was a common thing to get from 400 to 500 bushels of marketable potatoes from an acre where they used very large quantities of fertilizers.

Prof. ZAVITZ: It is not fair to compare yields of potatoes obtained in Ontario with those obtained in Scotland. The moist atmosphere of the British Isles is suitable for the production of plumper grain and larger yields than we can obtain in Ontario, and I think that this would hold true in reference to the production of potatoes. I certainly believe that we would obtain a larger yield per acre by the use of larger amounts of fertilizers, but we must remember that we would at the same time greatly increase the cost. As time goes on we hope to develop our co-operative work with fertilizers throughout Ontario. It takes time to experiment along various lines. We have conducted systematic co-operative experimental work with fertilizers in Ontario for a greater length of time than those of any other part of the world with which I am familiar. The results, although not answering all questions in connection with the application of fertilizers with farm crops, are furnishing us with some very important data. The information so far obtained is not only valuable in itself, but forms a most excellent basis and offers many suggestions for future work.

Q.—Do you sow the fertilizer broadcast?

A.—The fertilizers were all sown broadcast on the land at the time that the potatoes were planted, with the exception of the nitrate of soda, which was sown broadcast on the land when the potato tops were two or three inches in height, after which the surface of all the plots was stirred to a depth of about an inch.

REPORT ON FERTILIZER EXPERIMENTS ON SWAMP SOILS.

BY R. HARCOURT, PROFESSOR OF CHEMISTRY, O.A.C., GUELPH.

In the spring of 1904 we commenced a study of the composition and peculiarities of Ontario swamp soils. Since that time we have gathered a great deal of information by correspondence, regarding the extent and

productiveness of this type of land. We have also analysed forty-four samples of these soils and conducted both field and pot experiments with fertilizers, and pot experiments in inoculating the swamp soil by means of garden loam and farmyard manure.

In general, it may be said that where the swamp material lies over clay, and particularly if it is not so deep but that some of the clayey materials may become mixed with the top soil, good results are obtained. But when the materials are not sufficiently decomposed to form a soil that will hold water when the land is tile-drained, or when the subsoil is a sand, the results are invariably poor. The last type of soils usually produce fairly satisfactory crops during the first few years, particularly if much brushwood has been burned on the land, but after a comparatively short time the results are far from satisfactory. However, in so far as we are able to judge, these soils are not so common in Ontario as the swamp lands with clayey subsoils.

Out of the forty-four samples analysed, only three were found to contain less than one per cent. of lime, and none of them were noticeably sour or acid. Eight of the samples contained less than 0.3 per cent. of potash and only six had less than 0.2 per cent. of phosphoric acid. In nearly every case the lowest percentage amounts of these plant food constituents were found in swamp soils lying over sandy subsoils. The quantities of potash and phosphoric acid found in these soils are not large; but the average results show fully as much as will be found in most of our good arable soils, and some of them contain an unusually large amount. They also contain from four or five to ten times as much nitrogen as our ordinary soils. Consequently, it is evident that the non-productiveness of these soils cannot always be charged to the lack of plant food.

The results of our determinations of humus show that decomposition has proceeded further in some cases than in others, and, as the nitrogen and possibly the greater part of the mineral constituents are held in organic combination, it is quite probable that in many instances decomposition does not take place rapidly enough to furnish a full supply of food to the plant. Thus it would appear that anything that will hasten the breaking down of the organic matter in the soils should increase the amount of available plant food, and, consequently, the yield of the crop.

As a result of the way in which these soils have been formed, they are frequently deficient in the germs which cause the decomposition of organic matter. To ascertain whether inoculation with soil germs would increase plant growth, we conducted several pot experiments in which inoculation of swamp soil with garden loam was tried. In every experiment the plants in the pots containing the inoculated soil were the most vigorous. We also tried the effect of the addition of a small amount of farmyard manure and obtained a similar result. Both of these added materials contain immense numbers of germs capable of decomposing organic matter, and it is quite possible that the increased growth obtained was due to their aid in bringing the plant food into an available form. As we have not conducted co-operative field experiments on this point, we cannot say definitely how it will work out in actual practice; but many of our correspondents state that the application of light dressings of farmyard manure are essential to the successful cultivation of these soils, especially when the organic matter is deep. This is further confirmed by the results obtained in several of the experiment stations in the United States.

On the other hand, as our analyses show, there are some swamp soils, especially those with sandy subsoils, that are deficient in potash and, to

some extent, in phosphoric acid. We have found it hard to get fertilizer experiments conducted on these particular soils, and have been forced to carry on our experiments on any swamp soil that was not producing satisfactory crops. From year to year we have placed a number of experiments with the idea of ascertaining the effect of fertilizers; but, owing to lack of thorough drainage, and consequent drowning of the crop, the work of wireworms, or other causes, we have obtained comparatively few results. To keep the experiments as simple as possible, we have made most of them three-plot experiments. With corn these plots were one-tenth acre each in size, and with potatoes and oats they were one rod by two rods, or one-eightieth of an acre.

The following are the average results of the complete returns received:

	Fertilizers per acre lbs.	Oat tests bus.
No fertilizers	......	23.7
Muriate of potash	200	39.0
Muriate of potash and	200	
Thomas phosphate	400	43.1
Experiments with lime included:		
No fertilizers	......	19.0
Lime	2,400	19.6
Muriate of potash	200	25.8
Muriate of potash and	200	
Thomas phosphate	400	26.7

It will be noticed that potash gave increased yields, especially in the experiment in which lime was not used, while lime and phosphoric acid did not influence it very much. In some instances experimenters reported as to the appearance of the crop, but did not take the trouble to harvest and thresh the grain of the different plots separately.

We have received only one complete report with potatoes, but several experimenters reported decidedly better potatoes on the fertilized plot, but as they did not weigh the crop, we cannot record their results.

One serious drawback to co-operative work on these soils is that experimenters arrange their plots on insufficiently drained ground, consequently, when the season is wet no results are obtained. There have been so many failures due to the drowning out of the crop, that it would appear as though we are warranted in assuming that many of these soils are not drained thoroughly enough to insure a crop in wet, or even moderately wet seasons. Good drainage is naturally the first essential in bringing these swamp lands into cultivation, and it is only after this is accomplished that we can expect to get results, no matter what the after treatment may be.

CO-OPERATIVE EXPERIMENTS IN HORTICULTURE.

By Prof. H. L. Hutt, O.A.C., Guelph.

I. FRUIT GROWING.

The co-operative testing of fruit has been continued this year as usual. Plants were furnished to eight hundred and seventy-six experimenters. These, with the six thousand, six hundred and fifty-five lots which have been sent out in previous years, make altogether seven thousand five hun-

dred and thirty-one lots of plants distributed for co-operative testing. Some to whom they have gone have had failures and some have moved to other places, but the reports received show there are still over five thousand experimenters growing fruits that have been distributed through this co-operative work.

One of the most valuable features of the work has been that it has helped to introduce fruit growing in those sections of the country where fruit is but little grown.

The following is a list of the varieties of the various kinds of fruits which were sent out this year. This list includes only those varieties which by repeated tests here and at the various Ontario Fruit Experiment Stations throughout the Province have proved to be among the most reliable. They have been selected also with a view to making a good collection for home use, giving as much variety as possible, and covering the season from early to late.

1. *Strawberries*: Splendid, Fountain, Ruby and Parsons—12 plants in each.

2. *Raspberries*: Cuthbert, Golden Queen, Marlboro' and Columbian—6 plants of each.

3. *Black Raspberries*: Gregg, Kansas, Palmer and Older—6 plants of each.

4. *Blackberries*: (Adapted only to *Southern sections of Ontario) Agawam, Eldorado, Kittatinny and Snyder—6 plants of each.

5. *Currants*: Fay, Red Cross, Victoria and White Grape—2 plants of each.

6. *Black Currants*: Champion, Lees, Naples and Black Victoria—2 plants of each.

7. *Gooseberries*: Downing, Pearl, Red Jacket and Whitesmith—2 plants of each.

8. *Grapes*: (For *Southern Ontario) Concord, Wilder, Niagara, Lindley, Brighton and Vergennes—1 vine of each.

9. *Grapes*: (For *Northern Ontario), Champion, Worden, Winchell, Delaware, Lindley and Moyer—1 vine of each.

10. *Apples*: (For *Southern Ontario) Primate, Gravenstein, McIntosh, Blenheim, Rhode Island Greening and Northern Spy—1 tree of each.

11. *Apples*: (*For Northern Ontario) Transparent, Duchess, Wealthy, McIntosh, Scott's Winter and Hyslop Crab—1 tree of each.

A concise little bulletin giving cultural directions for the growing and managing of each of these fruits has been sent to each experimenter at the time he received the plants, and blank forms have been furnished each year on which to report the results of the season's crop, or in case of no crop, the vigor of the season's growth. These cultural directions have proved very helpful to beginners and in many cases to experienced growers in calling attention to the methods to be adapted in successful fruit growing on a larger scale.

Experiment with Strawberries.

Over four hundred varieties of strawberries have been tested here during the past fifteen years, and it has been found that no variety retains its supremacy very long; old varieties gradually give way to newer and better ones. And for that reason the list offered to experimenters has been

*This division of the Province into North and South may be approximately made by a line running from Collingwood to Kingston.

changed from time to time to include the newer and better kinds. In looking back over old lists, we find that the following kinds have been distributed for co-operative testing during the past fifteen years: Wilson, Bubach, Williams, Bederwood, Haverland, Woolverton, Van Deman, Clyde, Glen Mary, Saunders, Tennessee, Irene, Splendid, Fountain, Ruby and Parsons.

The varieties sent out for the past two years have been Splendid, Fountain, Ruby and Parsons.

From the reports received, Splendid and Ruby have been the favorite varieties. Both are heavy yielders, of fair sized and good dark coloured fruit. Splendid is a good early and Ruby a good main crop or later variety.

Observations of Experimenters. The observations of experimenters as to what they have learned from the work are often of much general interest, and a few of these may be noted.

One says: "I find you can scarcely get the ground too rich with well rotted manure, and that it is not well to let the runners set too thick."

Another says: "It does not do to plant strawberries on ground lately broken out of sod, as the white grub is almost sure to destroy them."

Another says: "I find no loss of plants when planted from my own stock. Those from a distance are often too dry to live."

Another says: "I find by thinning out plants to five or six inches, I have more and better fruit. I mulch the patch with stable manure, and the result is usually a large crop of fine berries."

Another says: "I have learned that it pays to experiment on a small scale, and plant in quantity those that do the best on my soil."

Another says: "I have learned that it does not pay to work hard all season with strawberries, and leave the garden gate open one night." The statement is explained by a previous one that "The cows got in and ate the plants off just when the fruit had formed."

Experiment With Raspberries.

The varieties sent out for this experiment have been the same from the beginning, viz.: Marlboro', Cuthbert, Columbian and Golden Queen, for nothing has been found that will surpass them in a general collection for home use. The Herbert is a new variety which may take the place of Cuthbert in time, but as yet the plants are very high priced.

About two hundred reports have been received this fall from experimenters to whom these plants have been sent. Some have had excellent results, some only fair, and some have had more or less of a failure. A comparison of the yields of these varieties is not of particular value, for they each fill a distinct place in the supply of fruit for the household. Marlboro is the leading early red, and Cuthbert the main crop red raspberry. Columbian is the best of the purple and Golden Queen the best of the yellow raspberries.

Experiment With Black Raspberries.

The varieties distributed for this experiment the last few years have been Gregg, Kansas, Palmer and Older. Other varieties sent out in earlier years and discarded were Sougegan, Tyler and Hilborn.

Gregg is still the leading variety in southern sections of the Province, where it stands the winter better than in the northern sections. Older is the hardiest of the lot and does well where the others are too tender. Kansas and Palmer do well in some sections, but neither of them bear as large fruit as either Gregg or Older.

Experiment With Blackberries.

Blackberries are less generally grown than any of the other small fruits, no doubt because they are the least hardy; but they fill a gap in the fruit season that no other fruit can, and where they can be successfully grown are one of the most profitable of the small fruits.

The varieties distributed for testing for several years back have been the Agawam, Eldorado, Kittatinny and Snyder. On the whole, Agawam has given the best results throughout the country, because it is one of the hardiest, but in southern sections the Kittatiny is still the favorite.

Experiment With Currants.

Two experiments have been in progress with currants for a number of years, one with red and white varieties and another with the blacks.

The varieties sent out for the former have been Fay, Red Cross, Victoria and White Grape.

The reports received show that Red Cross has been the heaviest yielder of the red varieties, although Fay is preferred by most of the experimenters because of its extra large fruit. White Grape should not be compared with the others, because it is so different. In most cases it out-yields all the other kinds, and is especially desirable for home use because of its better quality; but it takes the public a long time to find this out, for it seldom sells for as much as the reds on the market.

Experiment With Black Currants.

Black currants are among the hardiest of the small fruits, and may be grown in northern sections where other fruits fail.

The varieties sent out for the test of black currants have been Champion, Lees, Naples and Black Victoria.

There has not been a marked difference in the yield of these four kinds. On the whole, Champion has given a little the best results, with Naples a close second. With most of the experimenters, however, Black Victoria is a favorite because of its larger size.

Experiment With Gooseberries.

There are two distinct types of gooseberries in cultivation in this country, the English, or European, the plants of which are still imported every year, and the American sorts which have been developed during the last half century from our native species.

The European varieties, as a rule, are not quite so productive as the American varieties, but are much larger in size and finer in appearance. On the other hand, they are subject to mildew in this country, from which the American sorts are usually exempt.

The varieties distributed for co-operative testing, have been Pearl, and Downing, two of the American sorts; Whitesmith, one of the best of the English varieties, and Red Jacket, a hybrid between one of the American and one of the English varieties.

Plants for this test have been sent to six hundred and forty-eight experimenters. The results rank them in the following order for productiveness: Pearl first, with Downing a close second, Red Jacket third, and Whitesmith fourth.

Whitesmith, however, is a favorite wherever it can be grown free from mildew.

Experiment With Grapes.

Grapes are grown commercially only in the southern part of th Province, yet with the proper selection of varieties they may be grown fo home use over a much wider area. It was to encourage their more genera distribution that we added a grape experiment to our list three years ago Two different lists of varieties were offered, one adapted more to the souther section, which included Concord, Wilder, Niagara, Brighton, Lindley an Vergennes, and the other included a few of the earliest ripening kinds mos likely to mature in the shorter seasons of northern sections. The varietie in this list were Champion, Worden, Winchell, Delaware, Lindley an Moyer. Both of these lists include red, white and black varieties.

As it takes grape vines about three years to begin bearing, no definit results of comparative yields can be given.

Experiment With Apples.

The co-operative test with apple trees has also been in progress for thre years. Twelve hundred and nineteen lots of trees have been distributed; but of course, the reports so far deal only with the success or otherwise of th planting and the rate of growth of the trees. On the whole, these trees hav done well, and many experimenters report that all are living and doing well

In making the selection of varieties, the difference in climatic condition between the northern and southern parts of the Province had to be consid ered, consequently two different lists were offered. Those selected for th southern section were, Primate, Gravenstein, McIntosh, Blenheim, Rhod Island Greening, and Northern Spy, all apples of excellent quality and cove ing the season well from the earliest to the latest. The northern list include Transparent, Duchess, Wealthy, McIntosh, Scott's Winter and Hyslop Cral all hardy varieties which will be most likely to succeed where the winte are severe.

In concluding this, my fifteenth annual report on the co-operative test of fruit, I am sorry for some reasons and glad for others that this will b my last report in this capacity. I am pleased that horticulture in this countr has reached a stage when specialists are demanded in every branch of th work. For fifteen years I have had charge here of all branches—fruit grow ing, vegetable gardening, landscape gardening and floriculture. From thi time on I shall give my time especially to landscape gardening, with Mr Hunt to assist in floriculture. Mr. Crow, my worthy assistant, will tak charge of the work of fruit growing, with Mr. McMeans to assist in vege table gardening.

I wish to thank all who have taken part in these experiments for th hearty co-operation they have shown in the work, and for the many encou aging letters I have received from them from time to time. Whether c not the work will be continued in its present form will be a matter for cor sideration; but I can safely say that all of us engaged in horticultural wor here will be pleased to render the public, as well as our students, all th assistance possible, and I feel certain that under the present arrangemen better work will be done than ever before.

II. VEGETABLE GROWING.

Seed for co-operative tests with vegetables was sent last spring to tw thousand and twenty-three experimenters.

These experiments have been conducted in both town and country gar dens in every section of the Province. Because of the educational value o

the work, a special effort was made to introduce it into the schools. Every school in the country which has adopted school gardens conducted a number of the tests, and in many cases where there were no school gardens the children did the work in their home gardens. Our books show that nearly six hundred school children took part in this work.

The crops with which experiments were conducted were beets, carrots, lettuce, onions, and early and late tomatoes. Three of the leading varieties, which have done the best in our College experiments, were sent out for each test. Accompanying each lot of seed was a carefully prepared little bulletin giving directions for conducting the test and blank forms upon which to report the results. On the whole, the season has been a favorable one for this work, and a great many excellent reports have been received.

Experiment With Beets.

The varieties sent out for this test were Detroit Dark Red, Eclipse, and Early Model.

The information asked for regarding beets was not only which grew the biggest and gave the heaviest yield, but which were the earliest and of best quality. For many have learned from these tests that the largest are by no means the best beets.

Reports have been received from nearly a hundred experimenters, the majority of whom place the Detroit Dark Red first when both yield and quality are considered. Eclipse ranked first for earliness, but grows too large and rough for winter use when sowed early in the season. To get good beets for winter use experimenters were advised to sow the seed the latter part of May or first of June. Some experimenters preferred the Early Model because it grows smooth and shapely and not too large for winter use, even when sown early.

Observations by Experimenters. The remarks made by experimenters on their reports are interesting, and often indicate wherein this work has been of most value to that particular experimenter.

One experimenter of ten years' experience says: "This seed must have been better than what we get in the stores, as the beets did extra well."

Another says: "I have learned they must be thinnned early to get good early beets."

Another experimenter of twenty-three years' experience remarks upon the advantage of making two or three thinnings as recommended in our directions, first to two inches apart and then when the beets are about an inch and a half in diameter thinning out again, for in this way there are so many more beets fit for use.

Another experimenter says: "We have learned that the smaller beets are better than the larger ones for table use."

Another experimenter of twenty-five years' experience say he has learned, "That there is a great difference in beets as well as in other vegetables."

Another who has been growing beets for a lifetime says: "The Detroit Dark Red are the nicest I ever grew."

Another says: "I grew eight different varieties of beets this year and Early Model beats them all. I won first prize with it at the Dryden Fall Fair."

Another experimenter says he won first prize in the same variety at the Agricultural Fair held at New Liskeard.

Experiment With Carrots.

The varieties selected for the test with carrots were Chantenay, Danvers Half Long, and Rubicon.

As with the beets, experimenters were expected to take into consideraation quality as well as quantity.

Reports have been received from seventy experimenters, the majority of whom concede first place to Chantenay, with Rubicon a close second. The Rubicon is a new variety of good appearance and excellent quality.

Observations by Experimenters. One experimenter of many years' experience says: "It pays to prepare the ground thoroughly and keep the crop well cultivated. After using all we wanted all summer, we harvested one and a quarter bushels of Rubicon and one bushel of each of the others."

Another says: "I find by thinning and cultivating as per your directions, I have much larger carrots than I had last year on the same ground."

Another experimenter says: "I have taken much more interest in growing carrots because now I have learned how to grow them, and will follow your method in the future."

Another experimenter, who "has always grown a few," says: "I never grew such carrots as these before. This was a very dry year and carrots had a poor show, but these were almost too big. I wonder what kind of a crop I would have had if we had had more rain."

Another experimenter of fifteen years' experience says: "By this experiment I have become acquainted with three of the very best varieties, and from this on will grow some of these. For my soil I prefer the Danvers Half Long."

Experiment With Onions.

The varieties sent out for the test with onions were Prizetaker, Yellow Globe, Danvers, and Red Wethersfield.

These have long been known as the three leading varieties of onions, and among the one hundred and fifty experimenters who have reported, opinions are pretty well divided as to which is the best of the three. On the whole, the Prizetaker seems to be a favorite because of its size, but both of the others are better keepers for winter use. Those who object to a red onion prefer the Yellow Danvers.

Observations by Experimenters. From the reports received, it appears that a great many were of the opinion that onions could not be grown as easily from seed as from sets. Several experimenters says that this experiment has proven to them that they can raise a good crop of onions from seed cheaper than from sets.

One experimenter says: "These are the first onions I have grown from seed. I have learned a little about growing them, and will not be without them again while I have a good spot to sow seed in."

Another says: "This experiment has taught me most as to spacing and thinning the crop."

Another says: "I have learned that onions form fairly large bulbs even when allowed to grow in clusters."

Another says: "Prizetaker turned out more onions, but I don't think they are as good keepers as the others."

Another experimenter of twenty years' experience says: "I prefer Yel-

Experiments with Lettuce.

The varieties sent out for the test with lettuce were Black Seeded Simpson, Denver Market, and Hanson.

These have been three of the best among ninety varieties which have been tested at the College.

From the reports sent in, it appears that the experimenters are about equally divided in their choice between Black Seeded Simpson and Hanson. The seed of the Denver Market for some reason or other did not germinate well, consequently did not give as good results as usual this year.

The most important point observed by experimenters was the advantage of repeatedly thinning out the plants in the rows, first to three inches, then to six, and finally to twelve inches, to obtain full-grown, tender heads.

Experiment with Tomatoes.

Two different lots of seeds were sent out for the tomato tests. One lot of three of the later and better tomatoes, Greater Baltimore, Stone, and Success, which, as a rule, can be successfully grown in the southern sections of the Province, or where there is sufficient summer heat to ripen a full crop; and another lot of three of the earliest varieties, Earliana, June Pink, and Wealthy, which are usually in demand in all parts of the Province, but are particularly valuable for the northern sections where only the earliest kinds can be depended upon to mature a crop. The greatest popularity of the early varieties over the later ones by the general growers of the country may be inferred from the fact that while we had one hundred and fifty-one applications for the later ones, there were four hundred and fifty-five for the early varieties.

As it has turned out, however, the past season has been a record-breaker for the ripening of tomatoes. We had about one hundred varieties in our trial plots here, and had the finest crop of tomatoes ever grown on the place; even the late kinds, which some seasons will not ripen at all, matured a full crop.

The reports of the experimenters show that Success has been the favorite with those who conducted the test of late varieties. Greater Baltimore ranked second and Stone third.

Among the experimenters with the early varieties, there is a much greater diversity of opinion as to which is best, for all have done so well. A summary of the results shows, however, that Earliana is still the favorite, with Wealthy a close second, and June Pink third.

Observations of Experimenters.—A Grey County experimenter of twenty years' experience says: "We never got as good seed nor had as strong plants before."

Another experimenter of ten years' experience says: "The most important result observed is that we had ripe tomatoes this year instead of green ones. Thank you very kindly for the seeds."

A Muskoka experimenter of eighteen years' experience, with whom June Pink did the best, says: "We never had any do as well as these."

A Welland County experimenter says: "Spreading out the vines as directed in your instructions certainly makes a material difference in the earlier ripening of the fruit."

An Essex County experimenter who grows tomatoes on a large scale for market says: "June Pink is not profitable enough for the market because of its color. Wealthy is certainly a good cropper, but Earliana still leads with us."

A Perth experimenter sizes the varieties up well from the consumer's standpoint. He says: "June Pink is the best for slicing, being solid and meaty. Wealthy would likely lead in the market, being smooth and well ripened about the stem. Earliana is the earliest, but usually remains green around the stem, and is not nearly so solid in texture."

REPORT ON CO-OPERATIVE FORESTRY.

BY E. J. ZAVITZ, O. A. C., GUELPH.

This last season the Forestry Department has sent out to farmers for making plantations about 400,000 plants. This material was chiefly composed of White Pine, Scotch Pine, Jack Pine and Black Locust; these trees being best adapted to waste land planting.

In addition to material sent out for waste land planting the Department has supplied Public Schools with collections of small forest trees to be used in the school gardens or places otherwise provided on the school grounds. The collections this year were composed of the following species:—White Pine, Scotch Pine, Norway Spruce, Arbor Vitae, White Ash, Black Walnut, Butternut and Whitewood. This material is not large enough for final planting about the grounds, but is placed in nursery lines in a plot on the school grounds. It is expected that the children will be interested and educated in the care of these trees and later may take them home or plant them about the school grounds.

At a meeting of this Union held in 1903 there was a resolution adopted, two clauses of which I would like to discuss. The Union at this time urged upon the Government the necessity:

"For collecting accurate information from the municipal authorities as to the amount of lands unfit for agriculture in the settled townships of Ontario."

"For undertaking the practical reforestation of areas sufficiently large to afford forest conditions."

At the last session of the Legislature we find a vote for waste land reclamation, which marks the beginning of a policy to fulfil the needs outlined in the above clauses.

During the last two years a study has been made of conditions in the older townships. A report dealing with this will be published by the Government and I will only briefly describe the work.

We have in Ontario two classes of lands which it is advisable to manage for forest crops.

First, the small isolated patches of non-agricultural soils to be found throughout otherwise good farm lands. These are sand, gravel or rock formation, steep hill sides, etc. The reclamation of these worthless soils must depend upon local initiative, although Government assistance of an educational nature is advisable. The Department of Agriculture's co-operative distribution of planting material aims to do this.

Second are those large, contiguous areas of non-agricultural soils which can only be reclaimed through state management. We have in old, agricultural Ontario some few hundred square miles of these lands, some of which have been roughly surveyed, and are as follows:—South Norfolk, 10,000 acres; Lambton, 40,000 acres; Simcoe, 60,000 acres; Durham, 6,000 acres; Northumberland, 8,000 acres.

The above lands are all pure sand formation and have all had muc the same history.

The lumberman in early days took out the good timber. Some sectior have been cleared for farming purposes and since abandoned. In many cas the land is still being farmed, or rather attempts are being made to farm i This presents one of the worst features of the waste land problem.

Through the vote given by the last Legislature, reclamation work h been commenced in Norfolk County, so that I will describe conditions the more in detail.

The first land was purchased in South Walsingham, where a block c about 3,000 acres exists. The land purchased lies at the border of the are and is an abandoned farm. It left the Crown in 1804 and comes back t it in 1908, a period of over 100 years. It has all been cleared with the excep tion of about fifteen acres. This fifteen acres is representative of the entir area. It is covered with Scrub Oak and scattered scrubby White Pine If protected from fire this would soon fill with White Pine. might say right here that a large proportion of these lands in Norfol County and other counties do not present so much a problem of reforestatio or replanting as of protection from ground fires through proper management The scattered old scrub or defective Pine which the lumberman left ar always endeavoring to reproduce, but periodically ground fires sweep throug and kill the young Pines.

This first land purchased has enough soil suitable for nursery work, s that the Government nurseries have been moved to this district. They ca be managed here at less cost and can supply material for the co-operativ work as well as for local needs.

This farm is one of many which are gradually being abandoned, and give you the following to show the reason. There are two supposed source of revenue on these farms—growing rye and buckwheat. I will illustrat with the rye crop, which is probably the better investment:

Fall Rye produces on this land an average of 10 bus. to the acre which at 75c would be $7.5

Cost of preparing one acre of land (team and man figured at $2.50 per day).

Plowing	(man and team plows 2 acres per day)	$1.25	
Harrow and Roll	" " " H & R about 10 acres per day	.20	
Seeding	" " " seeds " 10 " " "	.20	
Seed	($1\frac{1}{2}$ bus. per acre @ 75c.)	1.12	
Cutting	....	.75	
Threshing	(2c per bus.—10 bus.)	.20	3.7
		Balance	3.7

This shows an annual revenue of $3.78 per acre, but does not take int consideration taxes, etc., which should be charged against the crop.

The policy of putting such lands under forest management has many arguments in its favor. It will assist in insuring a wood supply for the future; protect the headwaters of streams and insure breeding grounds for wild game. These areas being properly managed for forestry purposes will be splendid object lessons to visitors from surrounding communities.

Besides this economic aspect there is one of a moral character which appeals even more strongly as one studies the local conditions.

The story of the abandoned farm with its struggles if written would not be a mere fanciful sketch. As one writer has said, "It is a story of grim tragedy, written in varying forms as to detail in blood, and sweat, and tears, in Clarke, in Thorah, in Innisfil, and in a hundred townships of what we now call older Ontario."

H. R. McMillan: There are two very great economic reasons for carrying on this work. Probably the greatest and one which we are not very prone to realize yet, is the securing of timber. The people of southern Ontario very commonly believe that southern Ontario is all agricultural land, and very valuable, and that they cannot afford to raise timber on it, and that when the timber disappears from this country they will go further north and get it. I have just come back from a trip to the timber country of northern Manitoba, Saskatchewan, Alberta, and the east slope of the Rocky Mountains, and I do not feel the slightest hesitation in saying we have not got 10 per cent. of the timber in this country that we think we have. Further, when it comes to a matter of bringing that lumber down here, then the price will be double or quadruple what it is now, and another point we are overlooking is that the quality of the timber produced in southern Ontario originally was the most valuable of any east of the Rocky Mountains. The second reason why we should go ahead with this work is that it is the duty of the Government to make some use of these lands, and get the value of all our natural resources on our soil and with our stock and in the matter of seed and everything else. We are trying to do the best we can with what we have, and I think it is absolutely necessary for the State to undertake some steps to reclaim those waste lands

Mr. Zavitz has shown quite convincingly that there is no possibility of raising any agricultural crop on these lands. There are areas in this country that are no good for anything else all the way from Peterboro to Ottawa. In the rock region you can travel for half a day on the railroad and not see one prosperous farmer. The reason that no private party can be trusted to do this work is that the life of the individual and his ambitions are measured by the length of his days. He will not go ahead with a business proposition unless he thinks he can get returns from it before he dies, and we all know that we cannot get financial returns in the way of lumber from any of these plantations in any case in less than 60 or 75 years, and in a great many cases in not less than 100 years. Any person who has investigated the subject can see that at the end of 100 years or 110 years, figuring the cost of land and planting and everything else there is a good return, probably over 3 per cent. and sometimes as high as 10 per cent.

Another reason why it should be developed by State control is that the whole work should be done under one adminstration, so that there shall be expert technical knowledge available for the selection of areas, of the land to buy in order to get the best benefit from the money invested; how to plant and where to plant in order that organization may be developed to protect the growing timber from fire.

These are all reasons which may be given to show it is a State function to reclaim these waste lands. Any person who looks into the matter in Southern Ontario to-day, where manufacturing industries are increasing, and where hardwood timber is becoming more and more scarce, must see that it is a serious question. We have no hardwood in Canada outside of Ontario and Southern Quebec and a little in Nova Scotia and New Brunswick; in fact, our furniture is now being brought from Michigan, and our timber for implements is being brought from Ohio. It is not going to be very long before we will have no hardwood, and therefore I say it is absolutely necessary for the development of our manufacturing industries that something should be done.

The farmers need these wood lands for the protection of the water supply. I do not think it requires any further arguments whatever to prove it is a State function to go ahead with the reclaiming of these forest lands.

Mr. McCready: I would like to emphasize one of the points that was raised by Mr. Zavitz. He said that one of the things that his department was trying to do is to educate the people of the country through the public schools, in the matter of growing trees, by sending out to country and village schools in the Province trees to be planted on the school grounds or in the gardens or on some of the land adjacent to the school. I have come in contact with a number of teachers who have undertaken this work, and who speak very highly of the good that is being accomplished through it.

Mr. W. L. Smith: While we all appreciate the work Mr. C. A. Zavitz is carrying on, still, after all, this means adding to the prosperity of the people who are already prosperous. Yet the work of Mr. E. J. Zavitz is carrying one means more to the Province of Ontario than that; it means the actual saving of the lives of the people. I do not mean saving them from death, but from waste. I do not think I ever heard a more practical story than that Mr. Zavitz told us of a farm that had been farmed for 100 years and had given no practical returns. It means three generations of wasted lives in that part of the Province, and that is in one section alone between Peterborough and Ottawa. It is a positive crime to allow people to bring up families as they are bringing them up there at the present time. I think there is no more important work the Agricultural Department can carry on than the re-claiming of these waste lands. I believe our grand-children will reap greater benefits from it than anything else.

LEGISLATIVE CONTROL OF FEEDING STUFFS.

By Prof. W. P. Gamble, O.A.C., Guelph.

The subject of "Legislative Control of Feeds" has received considerable attention from the association in years that are gone by, and some important pioneer work has been done. For the benefit of those who are not conversant with the status of this work, I would like to state, first, the reasons why this association thought some action should be taken in the matter, and, secondly, state in brief what steps have been taken by the association.

The purchase of feeds, either to supplement home grown produce, or to provide the entire amount of concentrates needed, requires that care should be exercised in order to obtain the most economical results. It is now fully recognized that feeds rich in protein should be added to the home grown products if they are to be utilized to the best advantage, since, under average conditions, the crops of both grain and straw contain so great an excess of the carbohydrates, or starchy substance, as to make their exclusive use wasteful. The feeds that are best adapted to this end, namely, those rich in protein, as a rule, consist of residues from the manufacture of some specific product from the seed or grain, as, for example, oil from cotton seed and flax seed, starch or sugar from corn, beer from barley, and flour from wheat, rye and buckwheat. All of the feed stuffs which include cotton-seed meal, linseed meal, dried brewer's grains, gluten meal, gluten feeds, and the various kinds of bran, middlings, etc., are very much richer in protein than the original seeds or grains, because the substance extracted from them consists of fat, in the case of the first two, and of starch or products rich in starch in the case of the others, thus proportionately increasing the protein in the residues. For this reason, all of these by-products have been found to serve an excellent purpose in the building up of rations; they are generally palatable and healthful,

and if judiciuosly used, do not contribute any undesirable qualities to the products, beef or milk; besides, they possess the further advantage in that, in many cases, the cost of the ration is reduced by their use. Their intelligent purchase and economical use, however, require that the purchaser shall possess a definite knowledge of their composition; that is, he should know, first, not only how much protein and fat the genuine products of cotton-seed meal linseed meal, gluten meal, gluten feed, bran, and middlings contain, but also whether there is reasonable uniformity or wide variation in respect to these compounds in the composition of the products of the same kind or name; secondly, whether any of them are liable to be reduced in value by the addition of cheaper substances.

In order to furnish definite information concerning the character and composition of the feeds offered for sale, this College collected a large number of samples and analysed them, the results of which were published in Bulletin No. 138. The samples secured included most of the commercial feeds of the Province of the various classes, and the analyses, besides indicating average composition, showed that many of the various products sold were of good quality, and that those of the same kind from different manufacturers varied in their composition within quite wide limits. In 1905 a special study was made of the gluten products, or residues from the starch and glucose factories, as, owing to the large number of products sold under the general name of gluten meal or feed, it seemed desirable that we should have detailed information concerning their character, composition and usefulness. Let me at this point bear testimony to the fact that Mr. Shutt, chemist of the Dominion Experimental Farms, Ottawa, has drawn the attention of the Standing Committee of the House of Commons to this most important matter. It, therefore, seemed to us desirable that such definite information as we were able to obtain, both from our own work and that published by Mr. Shutt, should be pointed out; and that steps should be taken to have concentrated feeds classified according to their composition, rather than according to their brand name.

These special studies, coupled with the inspections ordered by the Department of Inland Revenue, Ottawa, led us to petition the Dominion for an Act to regulate the sale of concentrated feeds. A copy of the last petition may be found in the twenty-eighth report of the Ontario Agricultural and Experimental Union, page 74. Two years have passed since this petition was presented, but as yet we have been unable to obtain any definite reply with reference to it. I would, therefore, move that Professors R. Harcourt, C. A. Zavitz, and G. E. Day be appointed a committee for 1909, not only to communicate by letter with the Government, but to interview the proper persons with the view of obtaining an enactment of the law along the lines laid down in the recommendations of the Experimental Union. The motion was duly seconded.

MR. FRASER: I think that is perhaps the most important thing that has been brought before the meeting. The farmers all over the country are continually buying feeds and they do not know what they are getting. The Grain Commission held a meeting in Toronto some years ago, and samples of bran were brought there containing weed seeds that were alarming, and the results of feeding this stuff is very disappointing to stock feeders.

PROF. GAMBLE: During the past summer we have analyzed several samples of bran which we found to be heavily adulterated with oat hulls and other useless refuse, and this analysis simply confirmed our impression that it is absolutely necessary that something should be done.

The motion was carried unanimously.

THE VALUE AND THE SCOPE OF CO-OPERATIVE ASSOCIATIONS IN ONTARIO.

BY W. L. SMITH, EDITOR "WEEKLY SUN," TORONTO.

I have been asked to speak of the value and scope of Co-operative Associations in Ontario.

If all those who are present had seen the exhibit which the Norfolk Co-operative Fruit-Growers' Association made at the recent Fruit, Flower and Honey Show in Toronto, and knew the history behind that exhibit, it would not be necessary to say one word as to the value of co-operation as applied to at least one line of Agricultural activity. Co-operation has, in the case of Norfolk, been the means of placing one of the poorest apple growing counties in the Province in the front rank of apple production. It has been the means of introducing the best methods of cultivation and care where, before, there was practically no method at all. It has been the means of producing the very best quality where little but inferior was previously grown; and it has transformed orchards that were dead assets into most profitable properties. All this has been accomplished by the formation of a Co-operative Organization that has carried with it co-operative spraying, co-operative packing, and co-operative selling.

What co-operation has done in the case of Norfolk fruit growers it has also done, but in a larger way, for the Niagara producers of tender fruits. Fruit growing in the Niagara district was, a few years ago, a languishing industry. There was lack of sufficient outlet even for the volume of production of that day. Now, with double the production of ten years since there is abounding prosperity. This is the result of the introduction of a system, which by making possible shipments in car lots, has reduced freight charges; by the co-operative use of telephone and telegraph has made it feasible to so distribute shipments that there is neither glut nor famine in any section, and has even enabled Niagara growers to largely command such distant markets as those of Halifax on the one side, and Winnipeg and beyond, on the other,

What has been done in these two cases has been done, in a comparatively small way, in scores of other cases in which the principle of co-operation has been applied. Of these, however, I shall leave Mr. Lick, who is manager of one of the best Co-operative Apple Shipping Associations in the Province, to speak more in detail.

I shall now proceed to say something in regard to what I conceive to be the possible scope of co-operative associations in Ontario. I do not see any reason why these associations should be confined to the promotion of fruit growing and fruit selling. There is no sufficient reason, in my opinion, why the same principle could not be applied along a score of lines. Let us take a few lines by way of illustration.

In Southwestern Ontario corn is largely grown for sale; in Central and Eastern Ontario, corn is largely bought for feed. Why should there not be co-operative selling organizations in Kent and Essex through which sales could be made in car lots to co-operative buying organizations in the counties of Ontario and Wellington. Why, indeed, should those who are associated with Mr. Lick in co-operative apple growing and who are also largely engaged in the winter feeding of cattle, not buy their feed in this way? There is no reason, either, why such transactions should be limited to corn. In the Western Provinces there are large quantities of coarse and inferior grain to be disposed of every year. At present the only profit in handling this feed goes to the middleman and carrier. Why should not the grain growers of the

West, who have their own organizations now, sell directly to co-operative associations of feeders in this Province, and thus leave to be divided between producer and consumer a profit that at present goes to the middleman who stands between them.

In Kent, bean growing may almost be considered the chief industry of the country. What is there to prevent the formation of a co-operative association of Kent bean growers, with their own storehouses, from which car lot sales could be made according to the demand of the consuming market.

Onion growing is another industry which naturally lends itself to specialization, and one that is confined to a few localities. There can be no doubt that larger profits in this line could be realized by the building of co-operatve sales in car lots.

Poultry growing is fairly profitable now, but the profit might be largely increased if a number of neighboring farmers would keep the same breeds, in comparatively large numbers and provide for uniform grading of eggs, and the uniform dressing of chicks. Such an organization, which could promise certain delivery of large quantities of poultry and eggs of absolutely assured quality, might easily realize from 10 to 20 per cent, better prices than are obtained under the present haphazard system.

There is one thought which has often crossed my mind, that I would like to lay before this audience. Is it not possible to secure the organization of co-operative associations of consumers in cities to which sales could be made direct by co-operative producers' associations in the surrounding country? There is, if we take the case of two European countries together, a precedent for organization along this line. Denmark is almost exclusively an agricultural country with a large surplus of food stuffs for sale annually. Great Britain is almost exclusively a manufacturing and trading country and is under the necessity of importing a large volume of bread stuffs for home consumption. In Denmark the production and handling of the surplus of food stuffs is largely carried on through co-operative associations. In the United Kingdom a large proportion of the consuming public apply co-operative methods to buying and distributing. In Denmark, according to Fay's "Co-operation at Home and Abroad," one-fourth of the export trade in eggs is handled from point of production to the point of shipment through co-operative associations. Sixty-six per cent. of the bacon output is handled through co-operative factories, and 80 per cent. of the dairy products exported are produced and exported through co-operative federations.

In the United Kingdom, according to the same authority, 20 per cent. of the population, one-fifth of the whole, buy their supplies through great co-operative stores. The sales of these stores in 1906 reached the enormous total of $300,000,000, with profits of close on $10,000,000. The sales of these stores are made at regular market prices and profits are distributed as a bonus to the purchasers according to the volume of the individual purchase made. Thus at the end of three months or a year, these co-operators receive a lump sum which is really so much found money to them and that in the absence of co-operation would have gone to the needless middleman.

Now the idea in my mind is that an effort should be made to organize co-operative associations of consumers in Toronto and other cities which would buy direct from co-operative fruit growers, dairymen, poultry men, vegetable growers, etc., through the country. At present there are many lines in which the Toronto householder pays $1 for an article that returns to the producer 50 cents. I believe two-thirds of this loss should be divided between producer and consumer by the adoption of the method suggested.

The last point I wish to present for your consideration is this: The Department of Agriculture has done much, by its educational campaign, to increase production; should it not now direct its efforts largely towards improving the returns at the market end, by advice, direction and suggestion calculated to help on this great co-operative movement that means so much for Ontario agriculture?

I did not think we had gone so far as to have 90 leading varieties of potatoes in this province. If you go to the Commission houses in Ontario they will tell you it is an impossibility to obtain from any portion of this Province a car load of potatoes of any single variety, and as a result of that the dealers are going to the Maritime Provinces, where they can obtain not only car loads but train loads of one single variety. If the farmers would combine in one section to grow the same kind of potatoes and ship them in car load lots, there is no doubt they would obtain better prices. (Applause.)

Elmer Lick: I have been very much pleased indeed at the remarks Mr. Smith has made in connection with Co-operation. When coming up on the train, I was thinking of what was the foundation of the success of Ontario in the cheese industry. Was not it the beginning of co-operation? The farmers worked together at the factory. Has it not been continued largely on this co-operation plan?

Then my thoughts ran a little farther back, and I wondered why, in this day, we have forgotten the spirit of co-operation that existed among the first settlers in this country when they worked together and helped one another and put up their first barns and first houses, and many times helped one another in making the first clearing, and I thought we could achieve wonderful results by co-operation.

Mr. Smith spoke particularly of the apple industry, and what is true of co-operation in the apple industry would be true of everything else. Co-operation stands for these two things particularly, more and better quality, and marketed more economically, and the producer will have the best results for his labour.

Mr. Smith has outlined quite a number of things where co-operation should be possible. One thing he mentioned was the poultry industry, and right in our own section of the country that could be developed to almost as great an extent, and with as good results as has been obtained with apples. We are doing very well with apples; we handled 11,000 barrels last year under very discouraging conditions; we followed the same course this year, and it has been a pleasure to handle the apples—the dealers are tumbling over one another to get them. You can hardly leave the house for fear you will get a telegram or telephone message stating, "We want apples."

The whole thing resolves itself to this, that we must largely do away with our individuality. We must furnish the best produce we can, and then turn it into a co-operative association and be content with the directors and the management who handle it, for the very best results, and occasionally if it does not come out as we anticipated we must put up with the consequences, because in the long run we will be much better off. It is a question in regard to which we are only at the beginning, and there is no doubt we are going to make more or less mistakes. Let us learn to trust one another, and go on steadily until we shall make the Province of Ontario a better country to live in.

J. O. Laird: I am sure you have all listened with a great deal of interest and pleasure to the address by Mr. Smith and the discussion by Mr. Lick. Mr. Smith spoke of the corn we grow in Essex. There is a lot of corn grown there, and co-operation would certainly be a great benefit.

We have formed a company in the southern part of Kent, which is known as the bean section. We have a joint stock company that was incorporated in 1903 with a capital of $135,000 and about $14,000 paid in. The company owns a good plant for handling beans and other kinds of grains and has been doing business for five years. From August 1907 to August 1908 they handled 60,000 bushels of beans, 135,700 bushels of barley, 139,000 bushels of oats, and about 70,000 bushels of wheat, which makes altogether about 400,000 bushels of grain handled by that company during the year, and this number is about the average for the five years. It is managed by a board of directors. The reason the company was started was due to the combine among bean buyers in the city of Chatham. These buyers made a profit of at least 25c. on each bushel, and as much more as they could. As a result of the formation of our company, where we used to get 8 cents or 10 cents per bushel lower than we would get in Chatham or London, we are now able to get 10 cents per bushel more, and still make a profit sufficient to run the business and even a little more. I think we are safe in saying that each year we make 5 cents on every bushel. It amounts to about $24,000 annually and the company has been in existence five years. That means we have received $120,000 more than we would have received had this company not been formed, and the outlay so far has been between $14,000 and $15,000. $25,000 more in one community in a year is a great deal, and no doubt that scheme could be worked out throughout the Province in other lines.

This company handles salt, binder twine, and such things, and in that way sometimes saves the farmers considerable.

Q.—Do you buy grain from the farmers?

A.—We buy grain from anybody, whether they belong to the company or not. The Canada Milling Company also does business in the same town, and they have bought as much grain in the same season as we have, and they have been forced to pay the same price; and if you look at it in that way the amount has not been $124,000, but twice that.

Prof. Dean: I have taken an active interest in this matter of co-operation. Co-operation has been applied to the dairy industry in the Province of Ontario to a greater extent than any other branch of agriculture, and what it has done for the dairy industry, it will do for other lines of farming. I was very much pleased to hear Mr. Smith give his address and also to hear such kindly words of counsel from Mr. Lick.

I do not think we have had too much co-operation in the production of farm crops, but we have certainly been lacking in co-operation in selling farm products. We are weak in that direction. In Great Britain the railways publish a list of the farmers along their lines who have produce to sell; the list is published free and distributed to the people in London and the towns throughout which the railways run, and these people buy from the farmers directly. They carry ordinary farm produce parcels for 8 cents. We ship to a large number of customers in Toronto 24 lbs. butter, and they charge us 35 cents express for a distance of less than 50 miles, and that is more than double the price charged on the British railways. There is something radically wrong with our methods of selling in this country, and until the farmers co-operate and work together it will continue. I think what we need is a revivalist to arouse the farmers on this question of the value of co-operation in selling farm produce.

I will say to Mr. Smith to keep right at it, and not get discouraged, and he will meet with success in time.

W. L. SMITH: What Professor Dean has said with regard to express rates brings up a most important matter. The Railway Commission has power to compel the express companies to bring these rates down to a reasonable figure, and pressure should be brought to bear upon the present Government to compel them to give a parcel post rate in this country the same as in Great Britain, where you can send a parcel 3 feet square, and you can send your poultry or butter or fruit through the post office, and I would like to see a resolution passed here urging upon the Government that they give a parcel post rate the same as in Great Britain.

A MEMBER: How did the Grange pronounce on that matter?

W. L. SMITH: They pronounced favorably on it a year ago, but the greater the number of the organizations which pronounce on it, the quicker the Government will deal with the matter.

PRIZE COMPETITIONS IN STANDING FIELDS OF SEED GRAIN.

BY J. LOCKIE WILSON, SUPERINTENDENT OF AGRICULTURAL SOCIETIES, TORONTO.

When you consider that the field crops of the Province of Ontario amount to $140,000,000 annually, you can have some idea of the grand work that you are doing in improving the field crops of the Province of Ontario.

Last year twelve Agricultural Societies entered the grain competition and about 1,200 acres of land were utilized. This year we have 650 entries and nearly fifty Agricultural Societies, and in all 6,000 acres were utilized for this work of field crop competition. We confined our work this year to the oat crop. When you consider that 100,000,000 bushels of oats were grown last year in the Province of Ontario, you will realize that the oat crop of the Province is one of our most important ones. We have on exhibit at the Fat Stock Show to-day between 80 and 100 sacks of prize-winning grain taken from these fields. West of Toronto prize-winning lots are exhibited at Guelph, and those east of Toronto will be exhibited at Ottawa. Altogether we will have in the neighborhood of 150 bushels exhibited at the fair here, and nearly the same quantity at the Winter Fair at Ottawa, in January. The judging was done by judges selected by the seed department at Ottawa. In the Field Crop Competition, the stand of the crop, the apparent yield of the straw and the grain and the amount and the kinds of weeds and other impurities which grew up in the crop, were all considered.

We want to get as many of the farmers in the Province to take up this work during the coming year as possible. The judges delivered short addresses to the farmers in the vicinity where the field crops were grown, and gave reasons for their judgment.

I feel that it would be trespassing on your time to go further into this question. I know that it receives your hearty co-operation, and that the work has met with approval of the farmers of Ontario.

I was out in the western country a year ago and on my way home I looked through a number of cars that were coming to the Province of Ontario and were then at Fort William. I selected a number of small sacks from each car load and from 20 to 25 per cent. of them contained wild oats, mustard and other noxious weeds. If it is important to keep the cattle of the United States from coming into this country for fear of infection from

foot and mouth disease, is it not just as as important to prevent farmers in this country from being ruined by noxious weeds that are being sent here by the car load from other places. (Applause).

The men who produce grain in this country are important to the welfare of this great Province of Ontario, and I am in accord with what you have done in passing that resolution, and I hope urgent and stringent measures will be taken to prevent these noxious weeds from getting greater hold upon our fields.

We have issued a report from the Department of Agriculture, and if any of you would like to get it we will be glad to send it. It gives the names of the different kinds of noxious weeds that were found in the field crops that were judged in the recent Field Competition. Last year our grain crops fell down in yields in some instances. The winter wheat crop covered 679,000 acres in 1908, and gave a yield of 16,430,000 bushels or 24 bushels to the acre; in 1907 with this crop we had 676,164 acres with a yield of 23 bushels per acre. Spring wheat with a total of 2,197,000 bushels gave 15 bushels to the acre in 1908; the spring wheat crop of 1907 averaged 17 bushels to the acre. These figures indicate that we have been dropping back to some extent.

I am pleased to have had the opportunity of being with you to-day, and I hope you will feel that we are working hand in hand, and that we are all looking after the best interests of the farmers of Ontario. When you consider that we have 6,000,000 acres of grain in this Province, you will appreciate the great value of the work that we have in hand. I thank you for your kindly and courteous hearing and I hope at some other time I may have an opportunity of listening to the discussions that are of such vital importance to all who hear them.

I am glad to know that the students of our Agricultural College coming from the farm homes of this great country are doing themselves credit, and if they continue to do as they have done in the past they will climb higher the ladder of fame and make this College and this province a place to be greatly desired.

> "At least not rotting like the weed;
> But having sown some generous seed,
> Fruitful of further thought and deed."

THE ERADICATION OF THE PERENNIAL SOW THISTLE AND OTHER TROUBLESOME WEEDS.

By J. E. Howitt, Demonstrator in Botany, O.A.C., Guelph.

It does not seem right that I should discuss this subject when there are so many present who have had more practical experience than I have had.

The Botanical department, however, wishes to learn as much as possible about the weed pests of the Province of Ontario, and we open the discussion in order that we may hear the experiences of those who have had to fight these pests. There are many points that we may be able to clear up by free and open discussion. Nearly every man has his own idea about eradication of weeds; one man will tell you his method is best, and another will give you another method as the best. "The proof of the pudding is in the eating," and the value of a method is in its cheapness and effectiveness, and only those who have tried a method can vouch for this. It is from those, then, who have tried different methods that we wish to hear to-day, and we hope you will all take part in the discussion.

I will start with the Perennial Sow Thistle, because I think it is the worst weed we have in the Province to-day, judging from the number of enquiries we have received about it. I do not need to dwell upon it; I think you are all well aware of what a bad weed it is, but I will proceed at once to state how I think we can best control it. I think it can be controlled by education, by proper methods of extermination, by co-operation, and if necessary by legislation.

By education, I mean that all persons engaged in agriculture should make themselves so familiar with it; with its habits of growth, its methods of production, and the way its seeds are dispersed, and that they should be able to tell it from the other two sow thistles which are comparatively harmless.

Every week we receive specimens of the annual Sow Thistle sent in to us, and we are asked whether they are the Perennial Sow Thistle. I would therefore like to impress upon you the importance of knowing the Perennial Sow Thistle when you see it.

In the first place it will appear in a few scattered patches in the field. At this time it is not hard to get rid of. It is after it has been in a field a year or two and become established that it is such a serious pest. We have only one Perennial Sow Thistle.

The Perennial Sow Thistle is a tall, coarse growing perennial weed, with deep roots and numerous, thick, underground stems or rootstocks, commonly spoken of as "roots." Upon these at intervals of a few inches are borne buds which develop into new plants. The stem is smooth and hollow and the whole plant is filled with a bitter, milky juice. The leaves are pointed, 4 to 12 inches long, deeply cut with segments pointed backwards (runcinate), slightly prickly. The flowers, or more correctly speaking, the heads of the flowers, are about 1 to 1½ inches across and bright orange in color. The involucre, or as it is commonly called, the flower cup, and the peduncles or flower stems are covered with distinct yellow glandular bristles. The seeds are dark reddish-brown in color, about 1/8 of an inch long, somewhat spindle shaped with blunt ends, and each surface bears a number of very deep wrinkled longitudinal ribs. Each seed bears at the top a tuft of white silky hairs (pappus), which, when dry, acts as a parachute and enables the seed to be borne long distances by the wind.

I have just touched on these points to distinguish this weed, because I think it is important that everybody engaged in agriculture should know the Sow Thistle on sight.

Now, passing to the methods of eradication. These methods are put forward as suggestions; most of them have been tried with more or less success. I leave them with you to criticise and give us your experience. The first I shall touch upon is one that has been suggested by Prof. Zavitz, who found it successful in dealing with the Couch Grass.

Method No. 1. Cultivate the field until about the middle of June, running over it frequently with the cultivator, so as to keep the tops down and thus weaken the "roots." Then apply manure at the rate of about 20 tons per acre (12 good loads). Cultivate the manure in thoroughly, and with a double mould board plow slightly ridge up the land, making the ridges about 26 inches apart. On the ridges sow pasture rape at the rate of 1½ pounds per acre. It is important that the right amount of rape should be sown, for if too little is sown the stand will not be thick enough to smother the weeds, and if on the other hand too much is sown the plants will be too crowded and not grow vigorously enough to keep ahead of the thistle. Sow the rape when the land is sufficiently moist to insure quick germination of the seed.

If the rape is slow in starting the Sow Thistle may get a start in the rows and thus necessitate hand cultivation there. Cultivate the rape every week or ten days until it occupies all the ground and makes further cultivation impossible. If, when the rape is cut or pastured, any Sow Thistles remain, the field should be ridged up the last thing in the fall and put in with a hoed crop the following year. This should not be necessary if a good stand of rape is secured.

Method No. 2. This is a system of intensive cropping, suggested by Prof. Zavitz. As soon as a cereal crop is harvested, plow the land and give frequent cultivation to the first or middle of September. Then sow winter rye at the rate of about two bushels per acre. This can be pastured the following spring, or cut for grain or hay. As soon as the crop is off the land, put in rape, turnips or buckwheat. The advantage of this system is that three crops are harvested in two years and the Sow Thistle fought at the same time.

Method No. 3. This is a short rotation which has been recommended by several Farmers' Institute workers. Clover is followed by a crop of grain, then clover again. The clover is cut in June, and the land plowed about four inches deep and given frequent and thorough cultivation during the rest of the summer. The following spring a grain crop is sown, seeding down with clover. For best results the grain crop should be one which can be cut early enough to prevent the thistle from seeding.

Method No. 4. Directly after harvest plow the land lightly, and then give frequent cultivation as long as the season permits. The following spring gang-plow, and leave in summer fallow until it is time to sow fall wheat. The summer fallow to be effective should be a *bare fallow.* The field must be cultivated thoroughly and frequently, with the object of keeping the tops down and breaking up and bringing to the surface of the ground as many of the "roots" as possible. The gang-plow should occasionally be run over the field in order to insure the cutting of the roots. Bare summer fallow has given excellent results on the College farm in seasons when other methods were at best only partially effective.

Co-operation is essential in dealing with the Perennial Thistle. I believe all the farmers in the district must unite if this pest is going to be controlled, because a patch of Sow Thistle in one farmer's field may be a source of contamination for the whole neighborhood.

I think legislation may be necessary in dealing with this pest. It seems to me a time is coming when we will not tolerate the man who allows any bad weed to go to seed on his farm, and to become a source of contamination to his neighbor who spends a great deal of time and money to eradicate all the weeds from his farm, only to receive a fresh stock of seed year after year from his careless neighbor. I do not see why a man like that should be tolerated any more that a man who keeps a vicious dog.

These are points that I leave to your consideration, and I hope that every person who has had direct experience with this weed will take part and give us the benefit of their views.

W. S. Fraser: I have had experience with the Sow Thistle, but I hope none of you have had the same experience. I have been acquainted with it for a very long time. Some 17 or 18 years ago I was asked to bring a collection of weed seeds to an Institute Meeting, and I did not know Sow Thistle from anything else. There was a small patch of it on a small farm in our township; nobody in our neighborhood knew what it was, but they know now, and perhaps in our part of the country there is as much Sow Thistle as in any place in Ontario, and we think we are pretty good farmers.

There are two ways of killing the weed. One is to detach it from the soil, and another way is to keep it from getting the air, and in a greater or less time the weed must die. We can apply both of these to some extent. There are various ways of doing it. There is one way that is applicable in all conditions. Where conditions and one thing and another interfere with our methods you must have knowledge of the weed and be able to fight it when favorable conditions arise. It does not require as great a length of time to eradicate the Sow Thistle as we think. We are going to be forced back to summer fallowing, and I think it presents about as easy a way as I know of for getting rid of the Sow Thistle. It may be seeded for clover and about the first of June early pasture, and then broken up and kept cultivated. You will find that the Sow Thistle will disappear before the Canadian thistle will. It is more easily destroyed. The Canadian Thistle does not come up so quickly, and you do not have the same opportunity of checking it. We can eradicate with a hoe crop, but not in one season, and if you will follow one hoe crop with another you can get the Sow Thistle completely eradicated.

Short rotation is certainly a good way of dealing with it. Clover and grain and hoed crops. If the weed is so bad that you have practically the whole farm covered with it then you have got to adopt some drastic measure. Co-operation is a great word that the farmers have not yet found out the value of. It is certainly necessary to have co-operation to get rid of this weed. A man may cultivate his own farm just as well as he likes, but if his neighbor, say, five miles away, neglects the Sow Thistle the seed will be carried by the wind and dropped down on his farm, and where they are deposited they grow and become established in one season. The Canadian Thistle requires two season to establish itself. Where we find a Canadian thistle ocupying a patch in the field we give it treatment sufficient to eradicate it the next year. I have very little faith in legislation. We have had legislation on a great many things, and it has been a dead letter. It is an application of the legislation that is required.

There is another question I would like to raise. We have had certain periods in the world's history. In my short career in this world I have seen epidemics in the weed line that have caused considerable trouble. Go back to the early days when I used to have to pull pigeon weed. We used to have fields so over-run with the pigeon weed that we have had to abandon them, and yet we have no pigeon weed now. I do not want to advocate the abandoning of the fight, but I am just introducing the idea to see if there is anything in it.

I believe a particular weed has an effect upon the soil that makes for its own destruction. My reason for saying this is that a man said to me one day, "Sow Thistle is just like other weeds; I had pigeon weed very bad, and now it is all gone. I gave up hoping to get rid of it, but it is gone." It is a matter that might be discussed. The Sow Thistle is the most agressive weed we have in Ontario, and it prevents the growing of crops, and I think it is well that we should do the best we can to get rid of it.

MR. HOWITT: I might say that Professor Day informed me that bare summer fallow has given excellent results on the College farm.

MR. LICK: In our section of the country I am afraid we have a great deal more of the Sow Thistle than Mr. Fraser has, for some of us have had the third attack of it, and the feeling seems to be getting general among us that there is a time between the 15th of June and the 1st of July, when, if you plow down the Sow Thistle and cover it thoroughly and plant buck-

wheat or some crop that covers the ground quickly, you can practically get rid of the Sow Thistle no matter what the previous cultivation has been.

A field I had that was pretty bad with Sow Thistle was plowed at the right time, the last plowing being done about the first of July, and it was then sown with buckwheat, and I got rid of the Sow Thistle. I had an experience this year with a little weed I do not know the name of, but we summer fallowed it on the 23rd of June and I have seen no more of it, but in a narrow strip seven feet wide that we hadn't finished, the weed came up. I think if you plow the Perennial Sow Thistle down at the right time and sow a quick crop of buckwheat you will get rid of the weed.

A Member: Perhaps it would not be out of place were I to give you a little of the experience which the people of New Zealand had with the California or Canadian Thistle. It is going to ruin some of the finest land that we have in New Zealand. It takes hold of the land, and it is absolutely impossible to get rid of it. They have tried all sorts of methods, treating it with salt, putting straw stacks upon it, thinking that by that means they could kill it. They have pastured it with sheep, and tried other methods without avail, and the government have offered a bonus of something like £5,000 to the man who will discover a specific for killing it. Several specifics have been offered, but all on being tried have been found to be fruitless.

The latest one is electricity. A man has discovered an apparatus by which he can treat the soil with electricity. This electricity will kill all vegetation to the depth of 2 or 3 feet and in an area of about 12 feet square, and as far as I am led to believe this is proving successful and great faith is being placed in it, and the Queensland Government has offered over £3,000 for the invention. I am anxiously awaiting news from New Zealand as to whether this has been found to be an absolute success.

Another Member: We are not very much troubled with the Perennial Sow Thistle, but we are troubled with Twitch Grass, and if any members can give us a remedy for that weed I would like to hear from them.

Prof. Zavitz: The method Mr. Howitt referred to a little while ago has been successful for Twitch Grass. Some eight or ten years ago it appeared in our Experimental Grounds. About a quarter of an acre was completely covered with the Twitch, and we thought of different methods, and finally we tried a different method from the one usually adopted for Twitch Grass. We cultivated the soil in the spring of the year, and then manured the land at the rate of about 12 good loads of manure per acre, worked that to a certain extent and then ridged up the land about 26 inches apart and put in rape. The rape was cultivated occasionally when it was young and grew very rapidly. I do not know any crop more responsive to good cultivation than rape, and it was not long before it covered the ground and in the autumn we took off a crop of rape that yielded 27½ tons per acre, and by this method we completely got rid of the Twitch Grass.

A Member: This fall we plowed shallow and turned up the roots of the weed as much as we could to the frost, and in the spring we are going to put on the harrows and pull the roots from the ground and rake them off with a horse rake, and we are going to continue that until it is time to sow buckwheat in the late summer. If the same results can be obtained by Prof. Zavitz's method it will be much more economical.

Prof. Zavitz: It gives me such a magnificient crop of rape that it smothers everything else. I do not think it would be as effective if you sowed broadcast, because you cannot cultivate the rape. If the land is moist when the seed is sown and you thoroughly cultivate the land before

you sow the rape, then I doubt very much if you would have to use the hoe crop afterwards.

A MEMBER: We have a weed that covers the ground like a carpet. It grows up like a minature pine tree.

Mr. HOWITT: What you refer to is the "Horse Tail," or "Scouring Rush." The roots grow down into the ground very far, and the presence of this weed indicates lack of drainage—water below the surface soil.

A MEMBER: We have quicksand sub-soil.

Mr. HOWITT: It usually indicates that there is water below.

A MEMBER: We have whole fields covered with it, absolutely, and it seems to be spreading.

Mr. FRASER: I think it is an indication of want of drainage. You will find that weed will disappear when you drain the land. There is another weed that spreads at a tremendous rate throughout the Province and that is "Rag Weed." It is very bad along the roads, and in many places the streets and roadways are lined with Rag Weed. Some farmers are not aware of its pernicious effects, and I think it is well to call their attention to it. I can remember the time when I got a specimen of Rag Weed when it was growing at our depot and it was the only specimen around there. Now, you can find it on many farms and on the road sides.

Mr. HOWITT: One point is often missed in dealing with the Rag Weed. You will find it bears two kinds of flowers, one kind at the top and one at the lower part of the plant, and if you take off the top flowers and leave the bottom ones, which produce the seed, you are doing no good; you should be very careful to cut so low that you will remove the lower flowers, which do not ripen seed until late in the season. I think cultivation after harvest is one of the best methods of dealing with this pest.

Mr. FRASER: Where the land is seeded down to clover, you cannot cultivate it after harvest. The method we have adopted is to go over the ground with a mowing machine after harvest and cut it as close as we can before the seeds have developed.

SOME OBSERVATIONS ON FARMING IN SOUTHERN EUROPE.

BY G. C. CREELMAN, PRESIDENT ONTARIO AGRICULTURAL COLLEGE, GUELPH.

In the College herd last year one cow produced 20,778 lbs. of milk. She is a large, beautifully built, splendid looking cow, pleasing to the eye from every standpoint, and a great credit to the breed. You can then imagine my chagrin when, by contrast, the first sight that met my gaze in Naples was a herd of Nanny goats driven by a goatherd from door to door, supplying milk "while you wait" all day long.

ITALY.

And yet Italy has been practising the art of agriculture since the early, early days of old, old civilization, hundreds of years before the Christian era began, and agriculture is still the most important industry in Italy, as 85 per cent. of all the Italian soil is productive land. Dairying is not one of the leading lines, however, nor is any other kind of stock raising. Oxen and asses are still the principal beasts of burden, and wine the largest crop.

And yet, the agricultural products of Italy are varied, and in the aggregate amount to a very large total. Remember that Italy is only twice the size of the State of New York, and you will realize that not much land is wasted when the following crops are produced annually:—

	Bus.		Bus.
Wheat	143,400,000	Potatoes	19,360,000
Corn	85,600,000		Lbs.
Oats	19,360,000	Hemp	111,000,000
Rye and Barley	18,400,000	Flax	30,000,000
Rice	26,000,000	Cotton	22,000,000
Other Cereals	18,000,000	Tobacco	7,250,000
			Gals.
Total Cereals	310,760,000	Olive Oil	74,500,000
		Wine	666,000,000

But like the Swiss and the French, the peasant people are a frugal, thrifty race, and while the rich eat wheat bread, the workpeople are content with bread made from corn or rye.

Legumes Everywhere. In looking about, to find out how the fertility of the soil was maintained in districts where live stock was not common, and hence farm manure was far from plentiful, I noticed that everywhere leguminous crops (or pulse), were the rule. I also discovered that in some form it was eaten every day by rich and poor alike. All the time I was in Italy I never once sat down to a dinner without being served with peas, or beans, or lentils, or some other variety of leguminous annual. I found also that the poorer classes consumed large quantities of pulse, it being used to a large extent as a substitute for meat. Where the Irish peasant finds his balanced ration in potatoes and pork, the Englishman, in bread and cheese, the Scotchman, in oatmeal and milk; so the Italian rests content with macaroni and pulse, and the land gets the benefit in restored fertility.

France.

"A little land well tilled" seems to be the rule with the farmers of France. That the policy is a good one seems also to be worked out in practice, for in the past fifty years, while the increase in cereal acreage has been only 25 per cent., the increase of cereals produced has been 70 per cent., showing an increase of one-third in the productions of the soil.

Sheep. Sheep are a very important factor in the agricultural development of France. The Agricultural College at Grignon, near Paris, recognizing the value of sheep to the land, started careful breeding experiments with this class of live stock. Nearly 60 years ago the Merino was crossed with the English Leicester and a breed established known as the Dishley-Merino. This sheep is now found everywhere in France, and I saw one ram that had just been sold for $460. Individual lambs are given personal attention at Grignon. When twins are born one is always taken from the mother and placed in "The Nursery." Here "The Orphans" all feed from a common rack of bottles, ten in a set. This ingenious contrivance saves a lot of time in feeding and seems to please the youngsters very much. These little fellows were given barley-meal and linseed-cake very early.

Cattle. The French are not clever in the breeding of cattle, and the common practice of using oxen for work purposes has seriously interfered, and still materially interferes, with the production of draught horses. There are, however, a very large number of good Hackney horses of carriage size

but saddle type. These have been bred for war, and the breeding is kept up for the same purpose. Good sound mares are distributed by the Government among the militia officers throughout the country who are not in active service, and after three years, for one-third their value, such mares may be purchased outright by said officers and kept for breeding purposes at home. The practice has helped France and Switzerland to keep in the country a splendid lot of breeding mares.

Swine. In France the swine industry is also an important one, and the Berkshire-Yorkshire cross seemed very popular. Two-month old pigs of such breeding sold readily for $8 apiece. I saw a litter of seven, mixed black and white, still "suckers," sold for $56. Pure bred pigs of the same age brought $20 each, and gilts, eight to ten months, from $30 to $40. All young pigs, not intended for breeding purposes, were either speyed or castrated as sucklings, the males at five weeks and the females at three weeks old.

Crops. In France the principal farm crops are:—1, wheat, oats, rye and barley; 2, corn, potatoes and hemp; 3, madder (for dyeing), tobacco, saffron (for flavoring and coloring), and hops.

Tobacco is monopolized by the Government and yields a gross revenue of $75,000,000, but from this must be deducted the cost of manufacture and cultivation.

SWITZERLAND.

You may lie in a hammock under the trees at Montreux, on Lake Geneva, almost any day in January, while a walk of ten minutes will bring you to a place where tobogganning and skeeing are the principal sports. You may pick the most luscious grapes in the valley of the Rhone, and, looking up, see Mont Blanc covered with perpetual snow. You may see a hillside all divided up into small fields or farms, until a bird's-eye view looks not unlike the experimental plots at the Ontario Agricultural College, and yet the farmers look as well fed and thrifty, and appear happier and more contented than the average proprietor of a hundred acres in America.

Owing to difference of elevation, the climate is extremely variable, even in the same localities. Due to the same cause, few countries in Europe, even of larger extent, can boast of a more varied vegetation than Switzerland. In regard to vegetation it has been divided into seven regions. The characteristic product of the first is the vine, which grows up to 1,700 or 1,800 feet above the sea level. The next is the hilly or lower mountain region, rising to the height of 2,800 feet, and characterized by the luxuriance of its walnut trees, with good crops of spelt and excellent meadows. The third, or upper mountain region, which has its limit at 4,000 feet, produced forest timber, more especially beech, and has good crops of barley and oats and excellent pastures. Above this, and up to the height of 5,500 feet, is the fourth or sub-Alpine region, distinguished by its pine forests and maples; here no regular crops are grown. The fifth, or lower Alpine region, terminating at 6,500 feet, is the proper region of Alpine pastures. In the sixth, or upper Alpine region, the vegetation becomes more and more stunted, and the variation of the seasons is lost. The seventh, or last region, is that of perpetual snow. Many parts, even of the lower regions of Switzerland, are of a stony, sterile nature, but on every side the effects of persevering industry are apparent, and no spot that can be turned to good account is left unoccupied. Of the total area, over 28 per cent. is unproductive; of the productive area, nearly 36 per cent. is under grass and meadows. The chief crops are wheat, spelt, rye, oats and potatoes.

"We love liberty and poetry," said one Swiss farmer to me last May. "Our wine presses we call our drawing-rooms and our vats are our library." Every farmer grows his grapes and presses his own wine, and when he has sold his crop he is content to put his surplus cash to improving his little farm and increasing its fertility. Perhaps when our population becomes more congested, and we are forced to live upon a smaller acreage, we shall farm better than we do. We may then fight the weeds that take the place of the wheat, and remove the stones that take the place of wheat, and plow the fence corners that should be planted to wheat, and cultivate and fertilize to the fullest extent, so that we may have more wheat per acre. *Not more land*, but *a little land well tilled*. That seems to be the motto of the Swiss farmer.

Where dairying is practised soiling is generally in vogue. No grain is fed in summer, but after a little dry hay, fed at 5 a.m., the cows are watered, and then fed all the fresh-cut green grass that they will take. The manger is generally filled twice during the forenoon and again about milking time at night. In winter they feed at 6 a.m., and 5 p.m., just after milking.

The cows are generally the Spotted Swiss, or a grade which looks very much like her. Very often they are grey or mouse-colored, but always large and strong looking. At first glance they appear too beefy looking to give much milk, but on a closer inspection you find a good heart girth, indicating strong constitution, a large barrel, or bread basket, and a heavy bone. It is this last feature, I think, that makes them appear clumsier and more beefy in appearance than they really are.

The Swiss farmer believes in the general purpose type, His best grade cows, such as will produce 7,000 or 8,000 lbs. of milk a year, are worth on the market from $140 to $160 apiece, and after they have been milked three or four years they are speyed and fattened and sold for beef, bringing about $100 to $120 each.

Milk and butter average very little higher in price than ours, but the Swiss farmers are more economical feeders; their markets are right at hand, and the dry stock and young stock are sent to the mountains when feed is scarce in the valleys. A great deal of the milk of Switzerland is condensed milk, or is made into cheese, and Swiss cheese is popular all over Europe. It is open, having large air spaces and holes all through it, and is most palatable and digestible. It is invariably pure white and is served every day to every guest at the leading hotels in Italy, Switzerland and France.

Speaking generally of Swiss farming, I would say that their simple living, intensive methods, and their patient industry, in which every member of the family joins, account for the undoubted prosperity of the farmers of Switzerland.

Observations.

(1) The Italian or French peasant would keep fat himself and keep a large family on the wastes and leaks of the average Canadian farm.

(2) The Canadian farmer would give up business rather than have to put up with the great, lumbering oxen and small, pokey donkeys that do most of the farm work in these countries.

(3) The Latin farmer cultivates every foot of his land, has no fence corners, stumps, stones, or other encumbrances on his land.

(4) Many of our Canadian, or at least Ontario, farmers too often plow around, and harrow around, and mow round, and rake around, and drive

around, stone piles that should never have been placed on good land, in the centres of cultivated fields.

(5) The amount of hand labor performed on the farms in Italy, France, Switzerland, and even England, is remarkable, when viewed by a Canadian who has wrestled with the "No hired help" problem.

Now, I shall test the credulity of my hearers. In Italy I actually saw farmers, dozens of them, spading fields for wheat. The rank and file of the farmers know nothing of the improved agricultural implements.

May I be allowed to say, in conclusion, that while I found Italy too cold in April, and France too hot in May, and England too wet in June, Canada seemed just right when I arrived home in July.

PLANT INTRODUCTION AS A BASIS FOR CROP IMPROVEMENT.

By M. A. Carleton, Cerealist, Department of Agriculture, Washington, D.C.

The importance of giving attention to introduced varieties in improving our crops is sufficiently shown by calling attention to the fact that almost all our *present crops were at one time introductions. The chief exceptions* of any importance are Indian corn, tobacco, tomatoes, potatoes and sweet potatoes. All of our present numerous varieties of wheat, oats and barley have been introduced from the old world, chiefly from Europe and Asia, while the sorghums and rices have come from the warmer portions of the Eastern Hemisphere. All of the important standard varieties of forage plants and fruits have also been introduced. It is quite natural to expect, therefore, that we can look to this process of introduction for very important additions to our present crops. This supposition has been amply confirmed by recent facts to which I wish to call your attention.

Use of Introduced Varieties in Plant Breeding.

Many of the introduced plants have been absorbed directly into our *cropping systems and are rapidly assuming their positions among the standard* crops without change except such as may come about in the ordinary process of adaptation. Of equal importance, however, is the use of certain varieties in improving our present crops by crossing with native strains. Often such introductions are of an extreme form in cultivation or wild, and cannot be used in any other way. Other varieties, however, such as durum wheat, emmer, certain oats, rices, fruits and forage plants, may be used in their present condition as staple crops and also be utilized in cross breeding. For example, emmer may be used in crossing with other wheats to produce drought and rust resistant strains, and certain native forms of fruits from China may be and are employed in crossing to give hardiness to our own fruits.

Examples of Improved Introduced Varieties in the United States.

I am able to give some important examples of plant introductions into the United States, which I trust will be interesting, because of the fact that for ten or twelve years there has been maintained in the United States Department of Agriculture a distinct division of foreign seed and plant intro-

duction. This division of the Bureau of Plant Industry was at the beginning placed directly in charge of Mr. David G. Fairchild, who at present again has supervision of this work. The writer was chiefly instrumental in the introduction of the grains mentioned in this address, the operations being planned with Mr. Fairchild in the summer of 1898. It is of interest to note the fact that the same week that Cervera and his fleet were being bombarded in Santiago de Cuba in the war which finally resulted in the acquisition of insular possessions by the United States, operations were being planned which resulted in the addition to the same country of some of our most important crops.

It would be impossible in an ordinary address to describe even briefly all of the plant introductions of value made by the United States, and I would therefore call attention only to some of those which have become of the greatest importance in actually increasing the farm value of our crops.

Durum Wheat.

In recent years because of the great demand for new farming lands, a grea[t] deal of attention has been given to the exploitation of the semi-arid districts where heretofore it was supposed that practically nothing could be grown with any success. Because of popular interest in these dry lands, naturally the Department of Agriculture was led to investigate the possibilities of crop production on such areas, and it was found that certain crops, particularly grains and forage plants, have been grown with much success for many years in foreign countries in just such districts as these.

One of the most important of these crops, and in fact the greatest addition in recent years to the crops of the United States, is durum wheat, which was obtained from eastern and southern Russia. The area in the United States to which this crop is adapted is very large, including practically all of the region between the ninety-eighth meridian and the foot hills of the Rocky Mountains besides various intermountain districts. Durum wheat was introduced in the spring of 1899, more seed having been obtained two or three times since. The entire amount of seed imported by the United States Government has amounted to about 1,000 bushels. With this seed as a basis together with small amounts of Arnautka or "Wild Goose" wheat grown in our northwestern states, the increase in the production of durum wheat from year to year has been remarkable. No distinct returns are yet made on this wheat, but the estimated production for the year 1907 was between 45,000,000 and 50,000,000 bushels. For 1908 the production appears to be not much greater, but is probably over 50,000,000 bushels, or about one-tenth of the entire wheat production of the United States ten years ago.

This crop has thus given a tremendous impetus to agriculture on the Great Plains, and has largely extended the area of possible wheat production, so that at least 20,000,000 bushels of this wheat is now produced in districts where no wheat had been grown before. Estimating the farm value per bushel to be about 80 cents, it is therefore seen that the actual addition to the farm value of the wheat crop of the United States because of the introduction of this wheat is about $16,000,000 annually.

At first there was great opposition by millers to the introduction of this wheat, which opposition has not entirely ceased, but has certainly weakened to a great extent. A number of prominent mills are now using largely of the durum wheat, and are putting out regularly a durum patent flour. In addition there is a very large amount of the wheat used in the mills of this country for making semolina for the production of macaroni.

The export of durum wheat has reached the figure of about 21,000,000 bushels annually. After receipt of the first consignments of durum wheat from this country there was some hesitation on the part of foreign buyers in accepting it in the future, as some of the first wheat sent was of rather poor quality, but other lots exported since have been very much better, and after it was found that our country could produce as good a product as Russia or Algeria the increase in exports each year was very rapid. An interesting feature aboout this export of durum wheat is that a much larger proportion of it is now shipped to northern Europe than formerly. There is, therefore, an increasing amount being used each year for making bread. A considerable amount now goes to Scotland for that purpose.

It is of importance to note that experiments so far show the Kubanka to be the best of the durum varieties for bread flour.

Swedish Select Oat.

This variety of oat, obtained also from Russia, was introduced at about the same time as the durum wheat. It is a pedigree variety, developed originally in Sweden, and appears to be identical with the well-known Swedish oat called Ligowo. Our seed was obtained after the variety had been acclimated for several years in the St. Petersburg Government, a region rather similar in climate to that of south central Canada and of the northern United States.

This oat is found to be admirably adapted to practically all of our northern states, but particularly the region between and including Wisconsin and Montana. It has become very popular in Wisconsin, and the annual production in that state is now about 20,000,000 bushels, the entire production in the United States being about 30,000,000 bushels. The present farm value of the crop is therefore about $15,000,000 annually. The good qualities particularly characteristic of the Swedish select oat are its great hardiness under adverse conditions of climate, the yield per acre and the weight per bushel. Through a period of nine years in Wisconsin it has yielded an average of from two to five bushels more per acre than other oats. It is strictly of northern adaptation and fails to produce equal to ordinary varieties in districts below 40 degrees latitude. It is especially the kind of oats to grow on high, dry lands that have thorough drainage and even where the soil is rather poor. On low, rich land it will sometimes lodge badly.

Sixty Day Oat.

About two years later another variety of oat was introduced from south central Russia under the name of Sixty Day, which name is not correct, as the period of growth of the oat is ordinarily even more than ninety days. This is an extremely early variety, however, and its value is largely because of this fact, the earliness often enabling it to escape drouth and attacks of fungi and insect pests which would otherwise seriously damage other varieties before their maturity. This variety does not interfere in its adaptation with the Swedish Select, as it is suited to an entirely different area, chiefly the middle west of the United States. As a matter of fact, however, it is much more of a general purpose oat than the Swedish Select and succeeds very well in a large portion of the country. The Early Burt is better in the extreme south and the Swedish Select in the extreme north and west.

The appearance of this oat is very deceiving with respect to the actual weight of the kernel. The kernel is slender and pointed, but the hull is so

thin and the proportional weight of the "meat" is so great that the weight per bushel is ordinarily very good. In wet seasons it tends to become yellow, so that the grain buyers sometimes object to it on this account.

About the same time as the introduction of this oat, the variety Kherson was obtained from Russia by the Nebraska Experiment Station. This oat comes from about the same area as the Sixty Day and resembles the latter so much that it is believed that they were originally identical. These two oats have become very popular in the districts comprising Kansas, Nebraska, Colorado and South Dakota, and are now in great demand for seed.

Hard Winter Wheats.

The Kansas Turkey winter wheat is now a well known product in that state and is pretty well known even in Canada. During the past ten years our Department has introduced several much hardier strains of this class of wheats, one of which, the Kharkof, is found to survive the winter and the drouth considerably better than the ordinary Turkey. The correct name for this entire group of wheat strains is Crimean, the seed having come originally from the Crimea. The Kharkof strain having been grown much farther north in Russia has become adapted to more severe conditions of drouth and cold. It is particularly resistant to a combination of these two conditions. The use of the Kharkof strain has recently made it possible to grow winter wheat in a considerable area in Southern South Dakota and in practically any portion of Nebraska and Iowa, which condition was not true ten years ago.

Winter Emmer.

The peculiar class of wheats correctly called emmer, but generally known erroneously as spelt, has become rather common throughout Canada as a spring grown grain. It is grown also to a large extent in the United States. Recently a variety of this grain has been introduced by the United States Government which is perfectly hardy during the winter and succeeds wherever winter wheat can be grown. As in the case of winter wheats, the use of this variety permits a much larger yield per acre and at the same time allows a considerable amount of early winter pasturing. It is therefore an introduction that will soon become of great value to the farmer as a crop for stock raising. Recent experiments by different experiment stations have shown that emmer used as stock feed is almost equal to barley or oats.

Sorghums.

All the sorghums, both those used for grain and for forage, are characteristic crops of warm, dry latitudes, and so far are not of much importance in Canada. The success of their introduction into the United States, however, is very good evidence of the value of giving attention to introduced varieties. Over large areas of the southwestern plains of the United States grain sorghums, including particularly Milo and Kaffir, form the main crop, the one that can be relied upon year after year even where the rainfall is as low as fifteen inches annually. Feeding experiments with cattle and hogs have shown that these grains do not fall much below corn as a food for fattening. Selection experiments extending through several years have resulted in producing strains of Kaffir much shorter in their season of growth than those formerly grown, so that it is now possible to grow this crop on a much

larger area than formerly. Recently an entirely new crop of grain sorghums, known collectively as Kowliangs, has been introduced from China. These naturally have a shorter period of growth than other sorghums, and for this reason may be of great value in the agriculture of the middle Great Plains.

Japan Rices.

A very striking example of quick results obtained through the introduction of new crops is shown in the Japan or Kiushiu rice introduced by Dr. S. A. Knapp at the close of the last century. This rice has been found to be well adapted to the States of Louisiana and Texas. The chief advantage however, in the introduction of this crop is that this variety is so much more easily milled than the rice heretofore grown. The shape, size and texture of the grains permit it to be easily milled. For this purpose, therefore, it commands a little better price than Honduras rice, though many people still prefer the Honduras. The production of Japan rice ranks well with that of Honduras in our Southern States.

Drought Resistant Alfalfa.

The Turkestan alfalfa is now well known throughout North America. The first seed of this strain of alfalfa was obtained by Prof. N. E. Hansen, acting as agricultural explorer for the U. S. Department of Agriculture in the region around Tashkent in Turkestan in 1898. It is now handled regularly by the seed trade. This variety comes from a district of very small rainfall and is therefore very resistant to drouths. It is also markedly cold resistant, being one of the decidedly hardy strains. The introduction of this strain has improved the possibilities of the production of alfalfa in the drier portions of the United States by extending it over a larger area than formerly, and has thus been a means of greatly increasing alfalfa production.

The Grimm alfalfa of Minnesota, originally from Germany, and probably the hardiest alfalfa of all, is now known to be identical with commercial sand Lucerne, long known for its ability to resist drouth and to grow in poor, sandy soils.

Arabian and Peruvian alfalfas are both exceedingly promising in the extreme northwest. They not only grow much more rapidly than other alfalfas, but also grow later in the fall and earlier in the spring, so that from one to four more extra cuttings of hay have been obtained.

Cactus as a Forage Crop.

During the past five years it has been proven that in the vicinity of San Antonio, Texas, which is representative of a large stretch of territory, the lands are capable of growing under cultivation from 20 to 25 tons of cactus or prickly pear to the acre per annum, making a succulent forage that can be fed to stock any day of the year. A few people are now planting the crop, and it is more than likely that many more will plant as time goes on.

In recent years from 20 to 30 varieties of spineless forms of cacti have been introduced from the Mediterranean regions of Europe, Asia and Africa as well as from Mexico and South America. A dozen of these grow rapidly enough to make them promising as a forage crop. These are now being grown at Chico, and will be distributed and tested during the coming two years, the investigations being in charge of Dr. David Griffiths. These species are adapted to the region extending from the Sacramento Valley in Cali-

fornia southward and eastward from the southern Sierras to about the region of Tucson, Arizona, and extending southward along the Colorado River approximately to "The Needles." Another region extends along the immediate coast of the Gulf States. Outside of this region no spineless forms are hardy

THE SMYRNA FIG.

This fruit, though of no importance to the agriculture of Canada, will serve as another good example of the benefits from the introduction of foreign plants. This fig has proved to be well adapted to southern Arizona and California. The most interesting feature about this introduction is the corresponding importation by Mr. W. T. Swingle of the Capri fig insect, which is necessary in effecting the pollination of the fig flower. It was soon found that the introduction of the fig itself was barren of results without bringing with it this insect. The investigation of the habits and work of this insect by Mr. Swingle in conjunction with the entomologists of the Department is a very interesting portion of the history of plant introduction in the United States. The economic results of this introduction are that the fig industry to-day in California and Arizona is a very important one.

THE DATE PALM.

The introduction of the date palm corresponds very well to that of the Smyrna fig conducted during about the same period, and chiefly by the same explorer, Mr. Swingle, who has published a complete monograph of the botanical characteristics, drought resistant qualities, nativity, methods of culture, etc., of this tree. There are many varieties concerned in this introduction, coming chiefly from Algeria and Tunis, of which the most important one appears to be the Deglet-noor, so called by the Arabs. The introduced trees are grown chiefly in Arizona and Southern California.

CHINESE EXPLORATIONS.

More recently some very thorough explorations have been made of eastern and northern China proper, extending also into Manchuria and Mongolia. No extended trials have yet been made of the plants obtained in these explorations, but a number of things discovered are extremely interesting, and are likely to be of great value. The greater part of this work has been done by Mr. F. N. Meyer, who will continue his work during the present year. Some of the things of great promise already obtained are various dry-land rices, hardy and hulless oats, a seedless persimmon of great size and mild flavor, and numerous specimens of wild types of the pear, peach and apricot; also specimens of the Chinese chestnut.

INTRODUCTIONS OF INTEREST TO CANADA.

A number of the grains mentioned have already been found to do fairly well in portions of Canada, particularly the Sixty Day and Swedish Select oats. The Kharkof wheat also appears likely to do well in certain localities in comparison with other winter wheats. Some of the oats, barleys and fruits now being obtained from China promise to be adapted to certain portions of southern Canada, and it is expected during the coming year to give particular attention to fruits from Mongolia and Chinese Turkestan, among

which are likely to be varieties well adapted not only to our northern States but to different portions of Canada. Mr. Fairchild assures me that so far as any of these may be found suitable they will be available for use in Canada as well as in the United States.

PROF. ZAVITZ: I am sure we have been very much interested in this address by Mr. Carleton. I have known Mr. Carleton and his work for a long time, and I am sure we cannot but admire the large way they do things in the United States. I must say that Secretary Wilson and Mr. Carleton and all those in the Department have been exceedingly kind. If we have asked for anything that they have brought in from other countries, they have been willing to divide with us as soon as a sufficient quantity has been available and they have frequently asked for our co-operation. Although we have not done very much with the figs and the dates, we have been carrying on some experimental work with the varieties of grains that Mr. Carleton has referred to. The Swedish Select oats seem to do very well in the northern States, but so far they have not done very well here at the College, where we have had them under experiments along with a great many other varieties. The Early Kherson and the Sixty Day we have found very good early varieties of oats, and I would like to ask Mr. Carleton whether they are white or yellow. The seed we obtained was very badly mixed, and we separated the white and the yellow and both strains are coming true, and I am at a loss to know whether the Kherson and the Sixty Day varieties of oats should be yellow or white.

MR. CARLETON: I think they were originally mixed; I think the majority are yellow.

PROF. ZAVITZ: We have one other variety of oats at the College which is a little earlier than either of these; namely, the Early Ripe. So far, the Early Ripe variety has been almost immune to the attacks of smut. It is the only variety we have grown that seems to be immune to smut, and we are using it to cross with other varieties in order to see if we can introduce the immunity to smut in the other kinds.

The Hog millet, referred to by Mr. Carleton, is quite similar in its nature of growth and in its characteristics to the Japanese Panicle variety, which we have grown here for a number of years, and on which I reported yesterday. The Japanese Panicle has proven superior to the Hog millet as a fodder crop for Ontario.

The Kaffir corn, referred to by Mr. Carleton, has been grown here for a number of years, but we have found that our climate is rather too short for its development. We obtained one variety of Kaffir corn from China last spring which gave promising results. It was the tallest of the thirty varieties of sorghums which we grew in 1908.

I obtained from the Department at Washington and from other sources, alfalfas from a good many countries, numbering in all about twenty-eight or thirty different strains. The experiments have been in progress for four years. The Arabian and the Peruvian seed germinated very well and the crops made good growth the first summer, but both strains almost completely killed out the first winter. The Turkestan Alfalfa from imported seed has given very good results, but that from seed obtained from the American seed trade has turned out very poorly indeed. The Grimm Alfalfa and the Sand Alfalfa we have under experiment in 1908 for the first time.

We have had seven or eight varieties of durum wheat under experiment at the College for about fifteen years. The Wild Goose variety of durum wheat has given the best results, and we have used it extensively

in our co-operative experiments throughout Ontario. It is now grown in general cultivation in some parts of Ontario.

The Black Winter emmer, which has been grown at Guelph in each of the past two years, seems very hardy and is giving good results.

I thought I would thus briefly refer to these things, and give you our own experience with some of these crops which have been so ably described by Mr. Carleton. I am sure we are greatly pleased indeed to have Mr. Carleton with us, and to tell us what they are doing in plant introduction in the United States. I wish to move a hearty vote of thanks to Mr. Carleton for coming to us from Washington and for being with us, and for helping us so much at this, our annual meeting.

PROF. HUTT: I have very much pleasure in seconding that motion. Mr. Carleton referred to some fruit as well as grain, and I have been very much interested in his address.

The motion on being put to the meeting was carried with applause.

MR. CARLETON: I thank you for the pleasure it has given me to be here. Of course our introduction of plants have not been for Canada, because we do not live in Canada, and quite a number of those that would be hardy in the United States will not be hardy in your country. I think, however, that we will get strains of Alfalfa from Siberia that will be hardy in Canada, and better in this respect than those from Europe or from Turkestan.

FARMERS' INSTITUTE CLUBS.

BY G. A. PUTNAM, B.S.A., SUPERINTENDENT OF FARMERS' INSTITUTES, TORONTO.

The markedly beneficial results, both to the individual and to the community, following the organization of farmers for the purpose of studying, discussing and debating agricultural problems, and improving themselves in a literary and social way, at a number of places throughout the Province, years ago, even before Farmers' Institutes were organized, and the benefits resulting from the work of similar societies formed within the past few years, gives us assurance in bringing the question of Farmers' Institute Clubs prominently to the notice of the farmers of Ontario. The Department of Agriculture is much gratified to learn of the success attending the work of these Clubs during the past two years in many sections of the Province, and we believe that the good work being done by the Farmers' Institutes of the Province can be strengthened very materially by local organizations in those neighborhoods where even a small number of interested and enthusiastic farmers will band themselves together for the purpose of studying the possibilities of agriculture in their respective localities.

Institute delegates, and others who have had the opportunity of observing, have commented, time and again, upon the high degree of intelligence, and the up-to-date methods in those districts where opportunities have been afforded for the holding of periodical meetings for the purpose of discussing matters bearing upon the work and business of the farm. Many of the present day leaders in the agriculture of the Province are men who attribute much of their success to the early opportunities afforded through literary and debating societies and clubs organized for the study of agricultural matters and the comparing of notes with their neighbor farmers. Most of you are no doubt aware that the defeated candidate in the late presidential election has been a member of what corresponds to a Farmers' Institute Club for the

past twenty-five or thirty years. A good deal of his ability as a public speaker is attributable, no doubt, to the training which he received in this Club in his earlier days.

It is gratifying to note the spirit of enquiry among the farmers throughout the Province. The farmer who produces milk is now showing a desire to know as to whether or not the individual cows in his herd are being kept at a profit, how his herd can be improved, if he is receiving his just share of the price paid by the consumer for the milk, butter or cheese purchased in the retail store; the fruit men are fast adopting those methods of cultivation, spraying, packing, etc., which will insure them the greatest production and the highest prices; and the tillers of the soil generally are awakening to the fact that they must proceed on business lines and apply scientific principles if they are to receive just returns on the capital invested and for their toil. We believe that many are ready for the formation of organizations through which they will be the better prepared to improve their stock of agricultural knowledge.

There are usually a small percentage of farmers in each locality who are producing a superior quality of roots, grain or fruit, and who are practising successful methods in cultivation, feeding, breeding of live stock, milk production, etc. If the methods followed by these successful men were more generally known, a greater number of farmers in the vicinity would adopt similar methods. Then again, many farmers who consider the products which they are raising from year to year of superior quality, would, if they had the opportunity of comparing notes with their neighbor farmers, find many ways and means of improving upon their present methods, and thus secure even better results and increased profits. We wish to afford the farmers a means whereby they will have an opportunity to make the best application of the great fund of agricultural literature which is within the reach of all, to utilize to best advantage the services of lecturers sent out from the Department of Agriculture from time to time, to exchange views on the results of methods adopted by the farmers of the locality; in short, to furnish a means whereby the farmers will have a systematic and attractive method of studying their own business in their own way.

The work of the Clubs, so far as agriculture is concerned, need not, and should not, be confined to a discussion of methods for increasing the amount of produce per acre, the more economical feeding of animals, etc., but should also include co-operation among the producers of the district in the matter of purchasing supplies, and in the production and selling of grain, roots fruit, live stock and other farm produce.

We believe that in Farmers' Clubs will be found the opportunity for self improvement, for the farmers of Ontario, which cannot be secured in any other way. It is at once a simple and effective means to a desired end, and at comparatively no cost to those reaping the benefits. It is a means by which the information which is now placed in the hands of the farmers through the reports and bulletins of the Department, and the standard agricultural papers of the Province, as well as the leading weeklies, may be utilized to the best advantage.

It must be remembered that the degree of success attending this work will depend almost entirely upon the efforts of local men. Successful farmers who have enthusiasm and ability, and who are willing to devote time to the work, should be placed in office. Arrangements should be made at each meeting for definite subjects to be dealt with at the following meeting, or, what is better, a programme of topics with speakers prepared some months in advance.

The objects of Farmers' Institute Clubs are to encourage and maintain a better and more general and intelligent interest in all that pertains to agriculture in the broadest sense, by holding meetings at which farmers may receive and give information, suggestions and experiences, and study together how best to improve themselves and to help their fellow farmers; also to afford an opportunity in debate and study for members to become accustomed to public speaking, and to help develop talent along those lines that might otherwise remain dormant; to have them present addresses upon subjects relating to farming and dealing specially with the conditions existing in the locality; to increase the knowledge of and interest in the larger questions (not sectarian or political) of the nation, and which affect the social life and financial position of the farmer; to create and stimulate an ambition in our farmers, and especially the younger men, to be successful in the truest sense, and to not only raise the calling of the farmer to the place it should occupy in keeping with its importance in the state, but also to make use of his successes, opportunities and power, to make Ontario a still more desirable Province to live in.

Up to the present we have advised that a portion of the regular membership fee to the Farmers' Institute be retained for local club purposes. This has not proved very satisfactory, and we advise each club to set a fee which the officers consider necessary to cover local expenses, and those who wish to join the regular Farmers' Institute may do so by paying 25 cents to the Secretary of the Farmers' Institute for the riding. In many cases several from the one household wish to attend the club meetings, and it is necessary for only one to get the literature sent out by the Department. When the membership fee to the Club and Institute are not distinct and separate, confusion and difficulty arises.

Those Clubs which hold at least five meetings a year and report the same to the Superintendent of Institutes, and which have at least twelve members who also belong to the riding Farmers' Institute, will be entitled to a speaker for a special meeting, free of cost to the Club, except for transportation to and from the railway station and entertainment while at the place of meeting. Clubs will, no doubt, be able to get speakers through the local Farmers' Institute for a meeting to be included in the series of Winter meetings.

We trust that the ex-students of the College and others who are connected with this union, will take sufficient interest in this Farmers' Institute Club movement to discuss the matter with the farmers in their respective localities. We believe that you cannot do a better service to your fellow farmers and to yourselves than by providing a means through which an opportunity will be afforded for the study and discussion of agricultural problems in your respective localities.

I have not time to go into particulars in a short address, but shall have pleasure in mailing to any inquirers fuller information as to methods of organization, etc. Let me offer a few suggestions, however:—

Do not attempt to hold too many meetings the first season. Experience has shown that you will have a stronger Club by having four or five rousing meetings the first season, and then get down to regular and probably more frequent meetings the next year.

Political and sectarian questions should, we think, be avoided at all time in connection with Farmers' Institute Club work. It is strictly against the rules to discuss such matters when delegates from the Department are in attendance. We are strongly of opinion that there will be enough and to spare of purely agricultural subjects to occupy all the time which the farmers are able to devote to Club work.

In addition to the general directions given in the by-laws as to the work to be undertaken by the clubs, we beg to make some more specific recommendations. The nature of the work to be undertaken in each locality must, of course, depend upon the lines of agriculture which are followed successfully in the locality. If dairying is one of the chief sources of revenue to the farmers, then it would be well to have a committee to deal with dairying. This committee could well inquire as to who in the vicinity was making regular tests of his cows, and make arrangements with the owner to present the results of the work to the club for discussion. They might also carry on some sort of inquiry or line of experiments by which the cheapest method of feeding for the locality could be determined. It would also be within the province of this committee to make some arrangement by which sires produced from ancestors of well known dairy qualities could be introduced in the neighborhood. The proper care and handling of milk, and the sanitary surroundings of stables, milkhouses, factories and creameries should receive the attention of the organization.

Special work with reference to the breeding and care of horses, cattle, sheep, or bacon hogs should of course, receive consideration where any of these classes of animals are produced in anything like large quantities.

Have the committee on experiments canvass the members of the club, as to the experimental work which each will be prepared to take up. In this way unnecessary duplicating can be avoided and a wider range of work may be undertaken and the efforts of the individual will be of benefit to the whole community. The Club could with profit have one or more of its members conduct each of the experiments sent out by the Experimental Union from year to year and the reports of those experiments would form a valuable basis for addresses and discussions the following season.

We would strongly advise that the Farmers' Institute Club, and the local branch of the Women's Institute, co-operate in social gatherings occasionally. In fact, it might be well for the two organizations to have union meetings every two months, or oftener, if thought desirable. At these meetings more or less attention could be given to literary studies, music and debates. It will be advisable for these two organizations to co-operate in getting up entertainments or suppers with a view to raising funds to carry on the work.

The time has come when Farmers' Institutes must devote more attention to the holding of special meetings, that is, meetings at which one subject is taken up and dealt with in a thorough manner. The work of the Clubs will, no doubt, tend to strengthen this feature of the Farmers' Institute work. If the clubs grow as we expect to see them grow, it will call for a re-organization of the Farmers' Institute system whereby it will approach the methods now followed in conducting the Women's Institutes. The results attending the work of Farmers' Institute Clubs during the coming winter will be a determining factor in this proposed re-organization.

Mr. Munroe: Last year I held a number of classes throughout the county, and one of the most satisfactory results I see in them this year is the fact that the farmers in very many localities are wanting to come together and form organizations for the discussion of agricultural subjects, and I see in this the beginning of real co-operation among farmers. It looks to me as though farmers should co-operate better than tradesmen. When a man enters the shoemaking trade all the other members of the trade have less opportunities for selling their goods because of more competition. In farming this is not true. If a farmer in one community is engaged in horse-raising, and if the whole community engage in raising Clydesdale

horses, it would be to their advantage because the buyers know where to go to get Clydesdale horses and they will go to the locality where they will get the greatest number. I should like to mention advantages of the Farmers' Clubs, and to give you an instance of what occurred in Dundas County. A man there wanted to get potatoes. He came into the community and searched nearly all day, and was about to go home without his potatoes, when he chanced on a man who had some twenty bushels to sell, and who had been trying to sell them for two weeks. The question arose why should not they have come together sooner; and now they have organized a directory whereby every farmer who belongs to the Club is at liberty to register whatever he has to sell, whether horses, cows, pigs, grain, machinery or anything else. An outsider coming into that locality can go to that directory and find out who has produce to sell and make a direct purchase without waste of time. I think that is one of the latest improvements in agricultural education.

Mr. McKenny: I do not know that there is very much that I can add to what Mr. Munroe has said. We have some Farmers' Clubs in the County of Essex, and they have been very successful among the farmers in that district. From a business standpoint I think these clubs could be made of some practical value to the farmers, such as in the instance pointed out by Mr. Munroe. A great deal of corn is raised in Essex that could be sold for seed purposes. There is a great demand for this corn in the east, and what we are going to try and do is to co-operate with other Farmers' Clubs and get a list of our members who have corn for sale, and there is no reason why other Farmers' Clubs should not be able to buy this corn and do away with the middleman's profit. That is one of the things we are going to take up this year.

Mr. Hart: The subject of Farmers' Clubs is certainly an important one but I do not know that I can add very much to what has already been said. We have done considerable work in organizing these clubs in Waterloo County. One or two were already formed when I went there and I think the best thing we can do is to help them along, and we have been advocating the formation of these clubs. I have been at quite a number of their meetings, and at every one of them the discussions have been as good as you would hear at any Farmers' Institute meetings when the regular Institute speakers are present. I have been more than surprised and pleased at the way the meetings have turned out. Men who had never been on their feet before have developed into good speakers. We now have eight or nine clubs organized, and we are in hopes of getting the whole County organized in this way and we are going to try to have meetings once a month.

SOME OF THE RESPONSIBILITIES OF CANADIAN CITIZENSHIP.

By Dr. J. S. Willison, Editor *"The News,"* Toronto.

After a little pleasantry by way of introduction, the speaker proceeded to say:—It is a great pleasure to me for the first time to speak to the students of this great institution, an institution which in my humble judgment—I say it in all sincerity, and I have said it many times—is doing more for the well-being and the good reputation of the Province than any other institution within its bounds. (Applause). It is a pleasure also to meet the ex-students, who from year to year have gone out from this insti-

tution and have done so much to improve the material conditions of this Province, and to give to the agriculturists of Ontario their foremost position among the farming communities of this continent. I can remember many years ago, when I used to sit in the gallery of the Legislature representing a Toronto newspaper, that this Agricultural College was not held in the esteem in which it is held today; and I have watched with great interest its progress down the years, and its gradual growth in the confidence of the farmers and in the general esteem of the community; and I think we can say today that it is not only distinguished on this continent, but distinguished the world over, as the best agricultural institution in existence. I have heard that statement made in all sincerity by men entitled to speak from other countries, and I think the student roll proves that the statement is well within the fact. I was born on a farm, but if any one writes my biography, which is unlikely, I hope they will omit the agricultural record. I was not responsible for being on the farm; I left the farm as soon as I could—I imagine in my own interest and in the interest of agriculture. I became a journalist, and, therefore, entitled to speak with authority on agriculture.

I want to speak to you briefly but very plainly, if you will permit me, on some of the responsibilities of Canadian citizenship. You all have heard that this country touches on two oceans, and that we have majestic mountains and wide leagues of prairie, and rich forests and rolling rivers, and vast mineral wealth, and a climate which nourishes a superior race of men, and he would be an ill-conditioned Canadian who did not esteem this venerable peroration or who did not rejoice in this splendid inheritance. We have, as was said of old, "a land of brooks of water, of fountains and depths that spring out of valleys and hills; a land wherein thou shalt eat bread without scarceness, thou shalt not lack anything in it; a land whose stones are iron and out of whose hills thou mayest dig brass." But we made none of these things. A bountiful providence gave us our wealth of coal and iron and timber and fisheries and waterways. They are not the creation of any political party; they are not the legitimate possession of any Government. Our responsibility lies in the use we make of these resources, in the wisdom with which they are administered, and in the foresight with which they are conserved and developed for the advantage of this and future generations. A good many crimes are committed in the name of progress and development, and it is a spurious patriotism which concerns itself only with the material side of the Government. What I am trying to say is that we are responsible for the character of our free institutions, for the temper of our politics, and for the official and industrial conditions which prevail in Canada, and that we can take no credit to ourselves for the wealth which we did not create, nor for the advantages of soil and climate which naturally belong to this country. It should be possible in this new country, with the experiences of ages at our command, and with our vast natural wealth available as permanent sources of revenue, to build here a better civilization than any the world has known. If labour is not well paid and agriculture well rewarded, and the rural communities well served with schools and roads and mailing facilities and railway services, and the cities clean and wholesome, all other achievements have a secondary value. There is no particular virtue in a railway 5,000 miles long or 10,000 miles long. The test is in the service, and not in the length. When they shot the wrong man in a western mining camp they undertook to correct their mistake by organizing a gorgeous funeral for the remains, and they drove the body four or five times around the town, on the theory that in order to make a funeral a success you must have distance. Now, if you have the necessary extent of territory,

adventurous capitalists, and public credit, it is not difficult to stretch a line of steel across a continent, and from the purely national and imperial standpoint we would have reason to rejoice in the achievement; but the substantial value of the road is in the regularity and the efficiency of its service, in the standard of its freight and passenger charges, in the scale of wages, and the running regulations which affect its workmen, and in its general attitude towards the communities which it has the power to retard or to develop. And I sometimes ask myself if railway building in this country is to be forever a pauper industry, and if some of the glory which we ascribe to railway capitalists and railway builders does not belong legitimately to the workmen and the farmers and the trading classes who still contribute millions and to bear heavy burdens on account of the creation and maintenance of the railway services of Canada. There is national value and national reputation in a great through railway system, with fast trains and solid roadbed and double track, and Pullman and parlor coaches and dining cars and all the comforts and conveniences of modern railway equipment, but the railway has not discharged its duty to the community unless it also provides regular and adequate service, comfortable coaches and decent station accommodation on the branch lines of its system. More than that if the railway company fails to meet its legitimate obligations to local communities it is the duty of the Government, acting directly or through the Federal Railway Commission, to require the Company to improve its service and its accommodation and to fulfil fairly its contract with the communities affected. I know Western Ontario as well as most men, and I think it can fairly be said that for the last thirty years, a period peculiarly distinguished for social and industrial progress, and during which the through railway systems have undergone a revolution, there has been practically no improvement in the operation and the equipment of the branch railway systems of Ontario. The fact leads inevitably to one of two conclusions, either that the people are contented with conditions as they exist and have laid no obligation upon their representatives in Parliament, or that there are influences at Ottawa more powerful than the unorganized opinion of the constituencies. It is also a noteworthy fact that no progress has been made in the movement to abolish level crossings, although it does seem to me that if there is one question which demands imperatively the early and effective attention of parliament it is the development of a scheme for the abolishment of level crossings throughout the whole country. Nothing is further from my mind than to denounce public men or suggest that the parliament and legislators of the country are careless of the public welfare or neglectful of the great interests committed to their keeping. I know it is very often said that our politics are coarse and violent, and that the virulence of newspaper writers keeps many good men from devoting themselves to public affairs. I have the opinion that the plea is generally made on behalf of weaklings and incompetents. No newspaper or combination of newspapers ever killed a public man who deserved to live, or ever gave permanent distinction and authority to a public man who was not worth saving. I admit public service is an ungrateful service at best. There would be few of us either in newspaper offices or in parliament devoting ourselves to the public service if the only reward we expected was public gratitude. I say that not by way of complaint, but as a mere statement of fact, for the man who deliberately selects his lifework and whines over the doing of it is not worth his salt.

But there are evils in public life which deserve to be denounced, and there are charges which lie fairly against the public men of the country

Too often the parliaments and legislatures have to be driven by public opinion, and they give grudgingly and reluctantly the measures of reform in the advocacy of which they should be the pioneers. It required a newspaper campaign extending over many years to induce parliament to establish the Federal Railway Commission. It was mainly in response to outside agitation that the jurisdiction of the Commission was extended to the telgraph and telephone companies. Civil service reform was practically imposed upon parliament by outside agitation, and even yet the reform has not been applied to the outside service where the chief abuses of patronage exist. In the work of reform the fourth estate has become the first estate, and if the fact is an honour to the press it is not a credit to parliament. I do not suggest that governments should introduce revolutionary measures without consultation with the public outside, but I do contend that governments should not be mere registers of public opinion, and should not tolerate abuses until public wrath forces politicians to act out of pure concern for political safety. There should be agitation for reform in parliament as well as outside. There should be independent speech and aggressive action there as well as in the constituencies. There should be pioneers of progress there as well as in Boards of Trade, in Labour Congresses, in farm organizations, and in newspaper offices. Is it too much to expect that now and then governments will go in advance of public opinion in order to pass progressive legislation and to further desirable social and political reforms? If governments will risk public displeasure in order to grant bounties to private interests, to protect corporations, to vote millions in railway subsidies, to maintain the patronage list and the patronage system with all its abuses and evil tendencies, is it too much to expect that now and then they will venture to risk public displeasure in order to redress public grievances and to abolish time-dishonored practices? Sir, the member of Parliament who serves out his term, and on going back to his constituents for re-election can say for himself only that he never spoke except as he was instructed by party, and never voted except as he was directed by party, and that through the whole parliamentary term he linked his name to no measure of reform and made no good cause the stronger by his presence in the public councils, should never have gone to parliament at all and should not be permitted to go again. We Canadians boast of our British traditions and rejoice to belong to an empire which has been the pioneer of free institutions the world over. The concrete expression of all that Great Britain has done for the world's civilization is the Free Ballot. As Whittier said in words which the Hon. Edward Blake was fond of quoting, "The crowning fact, the kingliest act of freedom, is the free man's vote." For the ballot, which represents the freedom and independence of the citizen, Great Britain has fought bloody battles for centuries, has overthrown tyrants at home and tyrants abroad, and has scattered the bones of her sons over the whole earth, and yet there are those amongst us who sell the ballot for two dollars or five dollars or ten dollars, according to the condition of the market. It is not surprising when a shiftless tramp or some poor devil on the verge of beggary sells his vote for two dollars; but it is discouraging when public appropriations, dangled as bribes before well-to-do citizens, corrupt a whole constituency. Besides, the public money is extracted impartially from the pockets of all parties and all classes, and it is a solemn obligation upon governments to devote it to common public offices. Moreover, the system unavoidably breeds waste and extravagance, corrupts the public morals, and burdens the general body of taxpayers. There is great need, in my opinion to reduce our whole system of public expenditure. Public improve-

ments are placed where they are not needed; buildings are erected far more costly than the volume of local business warrants. Tens of thousands of dollars are spent on armories which are never used, or seldom used, and which serve no national purpose, millions are voted in subsidies to public services which private initiative and private enterprise should supply, and the public taxes are made the campaign funds of politicians. If we look back to the struggle for the first reform bill in Great Britain, and to all the glorious expectations associated with the dawn of democracy, we shall at least be forced to conclude that all the results have not been exactly according to the expectation. No one believes more firmly than I do that the world grows steadily better, and that generally the pessimists have been confounded and the optimists justified; but there is a vast work still to be done in improving representative institutions, in ameliorating social conditions and in equalizing the public burdens, and for my own part I do not look to the clubs, nor to commercial bodies, or even to the universities, chiefly for public spirit and moral energy, but to the men in the shops and on the farms, who all down the years have been the bulwark of every free nation and the support of all solid and enduring social and industrial progress. As I have said, there is so much still to be done—as Cecil Rhodes expressed it, "So much to do and so little time to do it." In Great Britain there are ten or twelve millions of people absolutely without the means of livelihood. The unemployed cluster in thousands in the great cities of the United States. The same problem touches us in Canada, and in Toronto we are facing the winter with grave apprehension. Now, I do not pretend to know the remedy for this periodical affliction of millions of the human race, but I do not believe that the misery of the poor will endure forever, and that down to the end of time this old earth will be a place of torment for multitudes of its inhabitants. We sneer at Woman Suffragists and Socialists and the apostles of revolutionary social propaganda, but let us not forget that, wild as some of their schemes may be, and intemperate as some of their utterances often are, they have a consuming zeal to abolish social and industrial evils and to make the world better. The cranks and the faddists and the disturbers have been the driving wheels of civilization, and always the men whom we crucify today, we crown tomorrow. I heard Edward Atkinson, of Boston, say a few days before he died, that for fifty years of his active life he had been denounced as a crank, and that for the last few years of his life he was honoured as an authority. So it has been all through the ages; and if the breed of rebels ever dies out this earth will become either too good or too bad for mere humanity to live in. In this country, even with all our natural advantages, our admirable system of free government, our high average of material comforts, and our high standard of popular intelligence, there still is need for rebels to war against political abuses and social injustices and industrial inequalities, and to level up the condition of the masses of the people.

THE STUDENTS AND THE EX-STUDENTS OF THE ONTARIO AGRICULTURAL COLLEGE.

By Dr. C. J. S. Bethune, Professor of Entomology, O.A.C., Guelph.

I feel very highly honored in being called upon this evening to propose what we must all consider the most important toast that could be proposed in an institution of this kind, that is, the health, the welfare, the well-being

the success and prosperity of the present and past students. As the President remarked at the outset, a College of this kind depends very much indeed for its reputation upon the character of the student body, of those who are here and those who have gone out from these walls. If the students are what they ought to be, if they are straightforward and upright, honest and steady in their work, amenable to those in authority, and take full advantage of all the opportunities that are afforded them, and when they go out from this place, if they maintain a high standard of work and conduct wherever they may be situated, then we feel sure that the College will be a success and that its reputation will extend, as that of this College has done, all over the world. But if, on the other hand, our men here should be slack in their work, careless in conduct, with no proper feeling of respect for the authorities of the College, it would not matter how splendid our buildings might be, how admirably we might be equipped with laboratories and other accessories of that kind, if the men themselves did not take their proper part and fulfil the obligations that rest upon them. In such a case as that no institution would succeed nor could its reputation last for any length of time.

However, let me turn to the subject of my toast. It divides itself naturally into three groups. First of all, let me refer to one of them, the students of the Macdonald Institute. Unfortunately for me, my acquaintance with those students is exceedingly limited, and has not been quite so extensive as that of my young friends here. I have opportunities of seeing them on the street cars, but unfortunately when I am getting on they are getting off, and I am led to feel somewhat envious of these young men who have the opportunity of travelling up from the town with them. However, I am able to say this much, and I have said it to my friends in Guelph, that if they ever see a fine looking young woman, healthy, robust, with rosy cheeks and the picture of everything a young lady ought to be, they may be quite sure that she is a Macdonald girl!

The second group consists of the ex-students, which, as the President pointed out, includes all those who have ever taken any advantage of the courses of this institution, whether it may be a short one of a few days or a course of four years, they are all our ex-students, they are all members of the institution, and we all look on them as part and parcel of the life and well-being of this College. The President has said a good deal with regard to them, and therefore I may say very little. However, I would like to mention that the College is now 34 years old, and some statistics have been made with regard to the first twenty-five years of that period, and it has been found that half of the students who have gone out each year have settled in the Province of Ontario; in the earlier years of the College there were a large proportion of young men from England and elsewhere who naturally were not likely to remain entirely in Ontario, and they have spread over the West and gone to other parts of the world; but of this 50 per cent. of the students the greater part of them are actually engaged in the pursuit of agriculture on some farm or other. It was considered in days gone by somewhat of a reproach that this College did not train up farmers, but after men had gone through the course here they took up other occupations, and that therefore it was a waste of energy and money to support an Agricultural College which did not turn out a large proportion of men devoted to agriculture. But that, I am happy to say, is a misconception. We find of this 50 per cent. of the students in those first twenty-five years that the greater part of them were genuine farmers and others filled positions on agricultural journals, in forestry work and in various occupations connected with farming. In the Department of Agriculture for Ontario, in the same Department for the

Dominion at Ottawa, in very many different positions, we find that posts are occupied, and well occupied, by students of this College. During the last ten years this proportion has very much increased, although I have no figures at my disposal at present. It is not necessary for me to dwell for any length of time upon the achievements of our ex-students. I trust that the gentleman who is to respond for them will be able to tell you, perhaps, more than I can possibly do.

Let me turn, then, to the third group that I wish to refer to to-night, and that is the students of the present day. I may say that when I came here —I am only now in my third year—I thought that as it was an Agricultural College there would be a good deal of rather raw material, that the common conception of an uncultured plowboy might prevail amongst a considerable number of the students. I had some sort of an idea like that; but I must say that I was most agreeably surprised and delighted with what I found. Friends of mine in Toronto and elsewhere, after I had been here a little while, asked me "What sort of students have you got at Guelph?" and I was able to say that I believed that they compared most favorably with any students I had ever met with in Toronto, and that in some respects I considered them superior. We can truthfully say that they far excel the students in the larger towns as regards behavior. So I am proud to feel, and I am sure you will all join with me in that feeling, that the students of the Agricultural College at Guelph can hold their own in comparison with the students of any other College or University in the D minion. When I say "hold their own" that brings me to another matter, and I hope that what I am going to say will be entirely agreed with by all of you.

This time last year, you may remember, we were all in a state of highest exhilaration over the success achieved at hicago when the Bronze Bull was brought back as our property forever. To-night it is evident that there is not quite that feeling of exhilaration, there is a certain amount of depression, that has been visible during the last few days about the College and the campus, and some amongst us, I am afraid, actually think that the College has suffered some disgrace by the small amount of success that was achieved the other day. Now, I would like you to think very differently from that. In these days of strenuous competition there has arisen a feeling that success is everything, and that success must be obtained by foul means sometimes if not by fair, and that the whole thing that we should aim at is, to use the common expression, to "get there," to win, to come out on top. Now, when we come to contests, whether it is on the football field or in athletic competitions, oratory, or music, or in stock judging or anything of that kind, we ought to feel that we must not expect to win every time, that the contest would be no contest at all if the same side always won, and that we must expect to take our share of the defeats when it happens to come our turn. The only thing that can disgrace a College team is their entering into a contest without proper preparation, and then when they are engaged in it without striving to do their best. Now, I know our men who went to Chicago went through all the preparation that they could, and that when they got there they did their level best, but the Fates were against them; there were conditions different from what they expected, and they had to to undertake trials for which they could not be prepared. That was not their fault; that was one of the fortunes of war, and they came out in a lower position than they hoped or anticipated. That will not be the case always, we feel sure; although when we look back on the victories of the past three years it was our turn to lose, and we ought to lose with good grace. It has been said that British soldiers never know when they are beaten, that is to

say, that though they may suffer defeat on the field of battle, they turn around and are ready to fight again. So let it be with us. Don't let us be down-hearted or too much disappointed. Let us nerve ourselves to do better next time, and feel that we have suffered no disgrace, that we have only failed because others had superior advantages, but they had not done any more real honest work or made any better preparation than our men. I must not detain you any longer, but I would simply say to all students past and present, whatever you had to do, whether it is in work or in sport, always "play the game" and play it fair. And one word more—be loyal to one another, be loyal to your College, loyal to your King and country, be loyal to this great empire of which we are so proud, then "play the game, and play it fair."

PRESENT PROGRESS OF THE ONTARIO AGRICULTURAL COLLEGE.

By President G. C. Creelman, O.A.C., Guelph.

It is my privilege, and I deem it a privilege, on behalf of the Officers and Students of this Institution, to welcome here at this time the ex-students of the College. I think that a very happy term which has been applied for long years to those who have come and gone from the Institution. It is not embarrassing to those who came, and through circumstances over which they had no control, left early; it is not embarrassing to those who came for a long course and because of circumstances at home, financial or otherwise, have gone back home before graduation, gotten along well and have helped their neighbors in the doing. That being so, I like the word "Ex-students" rather than Graduates or Associates. I say, the word "Ex-student" is a happy one, and for that reason I welcome back to the Institution any who may have been here a day or a month or have stayed for the four years' course and taken a degree from Toronto University. An Institution of this kind is probably more dependent upon its ex-student body than the ordinary university. At any rate I have no hesitation in saying that the best advertising—if I may put it on that plane—the best advertising this institution gets in this or any other country, is the young men who have gone out from our doors and have taken their places in the business world, be it the business of farming or any of the professions, for they have taken their place, and in season and out of season taken occasion to proclaim the fact that they have once been students of this Agricultural College.

It is the duty of the College President on occasions of this kind, when ex-students are present as our guests, to say something to them as briefly as may be of the progress of the institution and about the character of the student body at the time you happen to be with us. The student body this year again is larger than ever in the history of the institution. In all 1,208 individual students have been here for more or less instruction during the last twelve months. These have come largely, as you would expect, from the Province of Ontario. The counties that have been best represented have been, York 27, Wellington 25, Oxford 14, Waterloo 12, Brant, Wentworth and Middlesex 11 each, then Halton and Ontario each with 10, and the other counties in order all the way down to one from Algoma. So I thought it might be interesting to you to know that the Province of Ontario still keeps up and still sends to us from year to year an increased number of worthy students. When I come to the word "worthy" I hesitate a moment, because

(laughter)—I see some of you know why—because it has not always been so. There was a time when boys came to this institution from the towns and cities largely in this Province of Ontario because they were sent here. They didn't know themselves why they came. Some of them came on very short notice from home, but in my student days, and in the student days of many I see about me to-night, who were here even in the earlier years that I—they will bear me out when I say that when the institution was trying to make a place for itself in the agricultural system of the Province of Ontario, we did have more or less unworthy boys who came here and made life a burden to everybody in sight, some of those boys had no agricultural instincts whatever, and when later they found themselves on a good farm and surrounded with good farm conditions they were quite at a loss. At any rate by comparison with those days I am pleased to say to you at the present time that a large percentage of the student body come to us very largely on their own initiative, and what is more to their credit in many instances at their own expense. I want to relate an incident which is not on my programme to-night, but I cannot think of a better way of illustrating to our ex-students what I mean by worthy boys. When I came here in charge of the institution five years ago I found in the hands of the College President a sum of money, which had been left as a bequest to the Agricultural College in the will of our late lamented friend, Mr. W. H. Massey. After Mr. Hart Massey had left provision in his will for the building of our own Massey Hall and Library, his worthy son, Mr. W. H. Massey set aside certain shares of stock in the Massey Harris Co., the annual dividends for which were to be given at the discretion of the President to certain worthy students in attendance at the O.A.C. There was no string tied to it in any way. It was simply placed in the hand of the President, and he was instructed to give it to whom he saw fit. It occurred to me it would be somewhat different to anything I had had to do up to that time to begin to spend some one else's money. So I conceived the idea that all I had to do was to go through the residence and select some boys who needed the money, and hand it to them. Much to my surprise, ladies and gentlemen, after a personal canvass with the resident master, finding out just exactly all we could quietly about their financial condition, who were those who had earned money to come here or were borrowing money from banks, or were running short of funds, or were proposing to stop their courses until they had earned more, we picked out twenty boys who stood well in their classes and quietly led up to the subject as best we could. I asked each of the young men in turn if he would not under the circumstances accept $50 in cash, and every one refused. I didn't think there were twenty boys in America that would refuse a $50 bill under the conditions that it was offered. I know that at the time when I was going through the College, that it would have been a god-send to me. But every one of these boys, twenty in all, gave me a good reason; every one of those boys stood up and said, "No. Mr. Creelman, I need the money, but I can make my own way, and I prefer to do it." Then I was non-plussed. However, we hit upon this scheme. I wrote a letter and put it upon the bulletin board. It read something like this:

To Students of the Ontario Argicultural College, Guelph:

There has been placed in my hands by the executors of the will of the late W. E. H. Massey a small sum of money, to assist certain worthy students in completing their College Courses.

I know there are many students who feel that they should not be any longer dependent upon their parents for College expenses; many whose parents cannot really

afford to keep them longer at College and do justice to the other members of the faculty; and there are also many who are paying their own way entirely while at this Institution. Under any of these circumstances, I am sure there are boys who would prefer to borrow the money for at least the last year or two of their College work than to be further dependent upon their home folks. To this end I have been able to make arrangements whereby any student who has shown an appreciation of his College Course may borrow from this fund now in my possession sufficient funds each year as will materially assist him in the payment of all expenses, this to be loaned to the student on his own personal note and absolutely without interest, the amount to be paid back at the convenience of said student.

I should be glad if any student wishing to take advantage of this offer would meet me privately at any time and talk over his affairs, with a view to profiting by this generosity on the part of the late W. E. H. Massey.

I am pleased to say to you that under these conditions, I have 164 boys now on the list. I make this comparison, and I think it is to the credit of the boys from the farms of Ontario who have thought the thing out for themselves, that while they are not going to take charity from anybody, they have business sense enough about them to know if they can borrow that money without interest it is good business, it is doing well for themselves, and yet they are not under obligation to anybody for having helped them through their College course except to that extent.

At the present time we have in the student body young men from each of the nine Provinces of the Dominion and from ten States of the American Union, and in addition we have students from the Argentine, Belgium, Cape Breton, East Indies, England, German, Holland, Ireland, India, Japan, Jamaica, Mexico, New Zealand, Scotland, South Africa, Spain and from Wales. So that the institution, besides attending to the wants of the regular patrons who come to use from year to year in this Province of Ontario, we are privileged, and I say it advisedly, we are privileged to have with us young men from these foreign countries who come here with ideas of their own, who come here with customs foreign to ours, but who come here representing countries of great worth in themselves, and by mixing with our young men from the farms of this Province give to our young men something which I quite feel that you ex-students in particular, who had the privilege of associating with young men from foreign countries when you were here, will appreciate. We learn from their manners and customs, things which we would probably not have an opportunity to see during the rest of our lives. I pay tribute to the young men from foreign countries, and say to the ex-students I am always pleased to have them come to us from year to year.

I have just two things more to say. We are met with the criticism in later years, from time to time, that we are educating in our upper years a class of young men who were good practical farmers' sons when they came to us, but we are now educating them away from the farm. I want to say, that is probably correct, and I believe perfectly right. I shall explain what I mean. When I say to you that the work of our first two years is, as most of you boys know, thoroughly practical; that in it and through it we believe from thirty-five years experience of able men on this faculty, turning over what is best in curricula throughout the United States and throughout the world, they have boiled it down to a very satisfactory course of study for the average young man who comes to us with a practical knowledge of agriculture, but without much knowledge of good methods; and so we devote a great deal of our attention and energy in all our departments to these young men for the first two years, and I am pleased to say that at the end of that time the young men have very largely got what they came here to

get. They have a better knowledge of English; they can write well, they can express themselves on paper, they have had a certain amount of experience in public speaking, they have been living on a good farm of 550 acres for two years, they have been meeting practical men of the faculty, they have been rubbing up against one another from different parts of the Province, and at the end of two years they are prepared to go back home and take up the burdens their fathers are prepared to lay down, or divide with them those labors, if he is not yet prepared to retire on his own account. The great majority of our boys do that; more than 50 per cent. each year of our entire student-body return to the farm. This year, for instance, of our class of 90 in the second year we expect there would not be more than 40 who will return to us, and 50 will remain on the farms at home, though when I make that statement I have not the record of examinations to go by. Now, then, of the minority, those who are left, those that can be spared from home, those who by virtue of the fact that since leaving home younger brothers have come along, or those, who, by virtue of the fact that the father who thought he would retire but now feels he is as young as ever, and so makes it possible for the son to continue at College, and this other class who left the farm deliberately, but who yet believe in the science and practice of agriculture as practised in the Province of Ontario, and combined with the science as taught at the O.A.C. desire to keep in touch, and keep directly in line with the profession of agriculture during the rest of their lives, but they have no farm to go back to—this is the class of men we are criticised for over-educating or educating away from the farm.

That leads me to the second thought. Criticism was more or less justified on this ground alone, that, when these men got through, had taken their degree and stepped out from the walls of the institution, that there was nothing but positions in the United States to attract them, and that they were leaving this country after this country had educated them, and were going away to swell the ranks of Canadian boys who had already gone to the other side of the line; and there was some cause for that criticism. But at the present time the Dominion Government in their several agricultural branches, Live Stock, Good Seeds, Experimental Farms and all other branches in connection with that great Department presided over by the Hon. Sidney Fisher, are offering splendid salaries to many of our men. The Ontario Department of Agriculture and the Agricultural Departments of all the other provinces, the new Colleges at Truro, Winnipeg and Ste. Anne de Bellevue, the Agricultural Press from Sussex, N.B., to Victoria, B.C., all such institutions and organizations are looking to us for men. What would the thousand and one side lines, as it were, of the profession of agriculture that require business and scientific training combined—what would they have done in the Dominion of Canada if we had not been able to provide them with these men?

Then, again, a new movement has been set on foot. Two years ago some of us had the opportunity of putting our heads together and developing a scheme whereby individual counties might be given a graduate from this College, who would settle down there and become the representative of the O.A.C. and of the Department of Agriculture. I believe as I believe anything to-night, that that is the greatest movement that has been started in agricultural educational work anywhere in the world. Agricultural Colleges have, up to this time, been trying to do a scientific agricultural work by taking less that 1 per cent. of the farmers' sons in the state or province, and,

after giving them a certain kind of instruction, have sent them out to leaven the whole lump. We are just touching the edge of it; and while the wheat crop in England still keeps up an average of 30 bushels per acre, the Province of Ontario has an average of less than 22 and the United States of America an average of only 12. A new country, and yet we have let our land degenerate to that extent and think that one Agricultural College in the Province can bring it back. Now that has been our mistake, and we are just trying to remedy it in this way. There are farmers within ten miles of the City of Guelph, who, if you drive out and hitch your horse in front of their gate, and ask them what the O.A.C. has done for them, will tell you "Nothing." They may be right or not. The chances are they are wrong. It may be Institutes or short course, it may be directly or indirectly through the education of some of their neighbors, or by bulletins or reports, they have gotten some information which has helped them in their business; but it may be the other way, and we certainly are not doing very much for such fellows. And why not? Simply because the farmer as he works upon his farm, is not the kind of man who puts himself in communication by correspondence with anybody else in his world. He sometimes even neglects to write to his own sons and daughters when they go away from home. I know farmers will bring me letters on the June excursions that they have written to me two or three months ago, and have carried it in their pocket all that time. The point I am getting at is this, that if there was a representative of the College, and the Department of Agriculture in the county town, who had driven out frequently to that man's farm, who had an office where the farmer could drop in, and instead of writing letters he could ask questions, and bring in while the weeds are yet fresh, samples for identification, samples that they intended some day to wrap up and send to the Agricultural College for identification, but which they didn't do, a place where free information was to be had at first hand and when wanted, there is no estimating the good that might be done. I say, the farmer, we must recognize, is not a writing individual, and often not a reading individual, but a thinking individual, a man who, the rural preacher will tell you, can pull his sermon all to pieces the next morning, a man who reads little, but thinks a great deal. That kind of a man is the kind of a man who can only be reached by personal contact. And these young men, in the county towns in eight of our counties, are already finding themselves so much taken up with that work that an assistant had to be given in some instances, a stenographer in another, and now they are applying for permanent assistance the year round.

How far reaching is such work going to be? Cannot you see that if a graduate of this College who had a good practical farm training before he came here, has spent four years here, and gone back to his own or some other county where be comes in contact with men who will take his hand and ask questions and talk freely with him, and who may say to him, "We are glad to see you, but the Agricultural College cannot help us,"—cannot you see how the whole country would be helped, and how the difference between the average and the possible crop would soon close up? I bring you this message to-night as ex-students, and to say to you that not only are these young men representing worthily your Alma Mater, but if the present Government will see its way clear to extend the work, there will soon be an outlet at home for brain work, as well as for the brawn of the young men who come to us from time to time from the farms of the Province of Ontario.